CROP MANAGEMENT TECHNOLOGIES

USER MANUAL

RadioNet

NETAFIM™
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Document Update

Revision	Description of Change	Change Number	Date	Approval
Draft	Original Version	0000	20090702	P.Bail

Application	Version
PoleNet	V1.61 or greater
RadioNet Host	V1.61 or greater
RadioNet Base	V2.27 or greater
RadioNet Remote	V2.27 or greater
NMC Pro	V3.02.08 or greater

Date of issue: 2nd July 2009
Publisher: Netafim TM (A.C.S.) Ltd.

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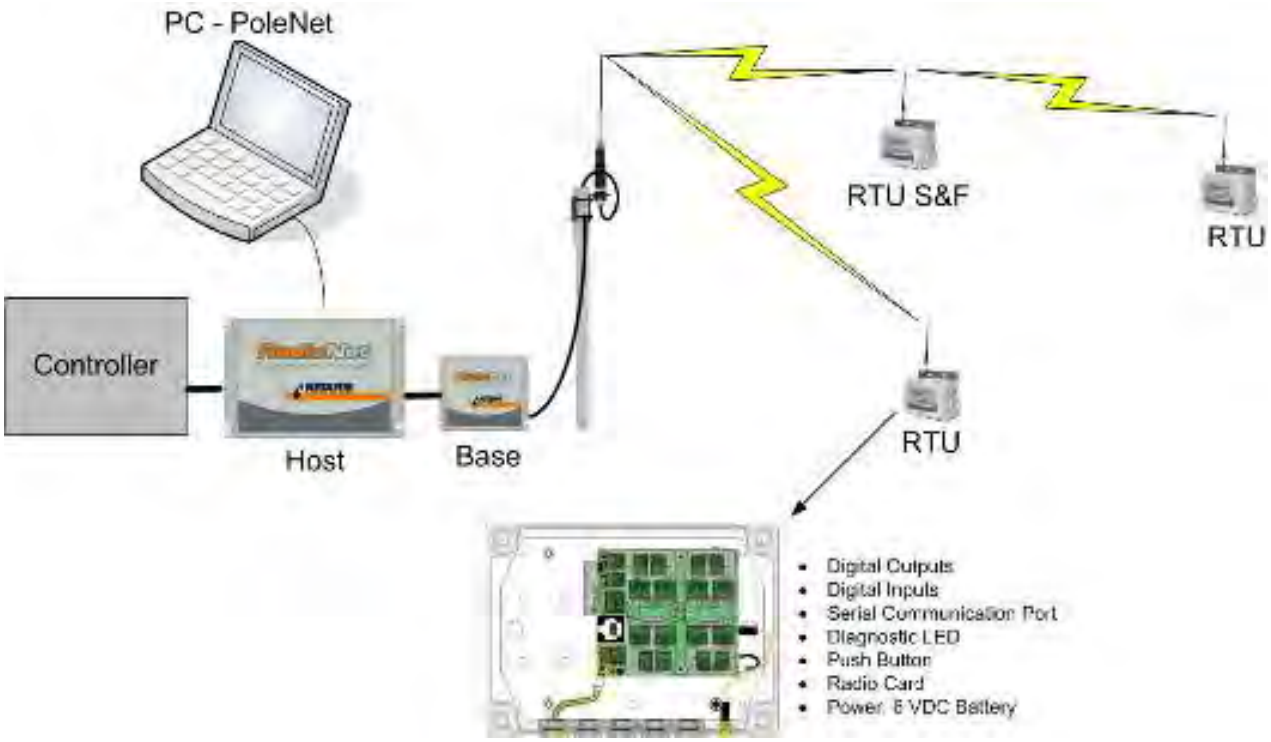
1. Introduction

RadioNet by Netafim is the new generation of wireless control and monitoring systems. Extra detail has been given to the RadioNet range of products to make it versatile, reliable and user friendly.



The 3 basic components include the Host, Base and Remote units.
The Host includes multi interfaces giving it the ability to integrate to a wide range of controllers commercially available for horticultural automation.
The RadioNet Base can manages up to 254 remote units in a wireless network including the option of using multi layer store & forward (SAF) repeaters.
The RadioNet remote units are modular in size from 1,3,5,7 and 9 digital outputs.

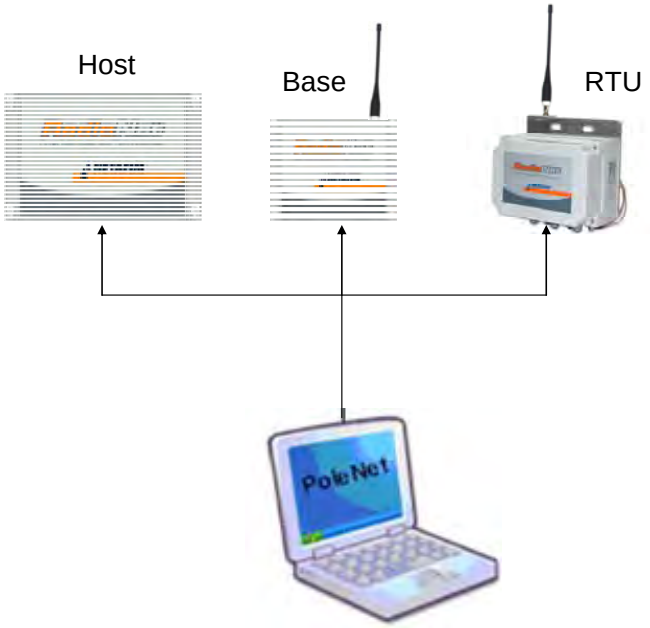
Establishing wireless connectivity presents a unique set of challenges, which often includes natural obstacles, remote locations and distant central office. There is a need for amplified reliability to protect against unplanned downtime in the operation process. There may be already-in-use technologies that will not enable wired solution (retrofit).
Understanding these issues and how to address them is essential in deploying a remote wireless solution.

Netafim's broad-base design, manufacturing and engineering capabilities gives RadioNet the distinct advantage of having a full control and monitoring solution under one reliable system.
Its superior communication, connectivity and programmability makes RadioNet an agile system that enhances the performance, data and operating reliability of remote sites.

2. PC Software - PoleNet

The PoleNet PC software includes three basic functions.

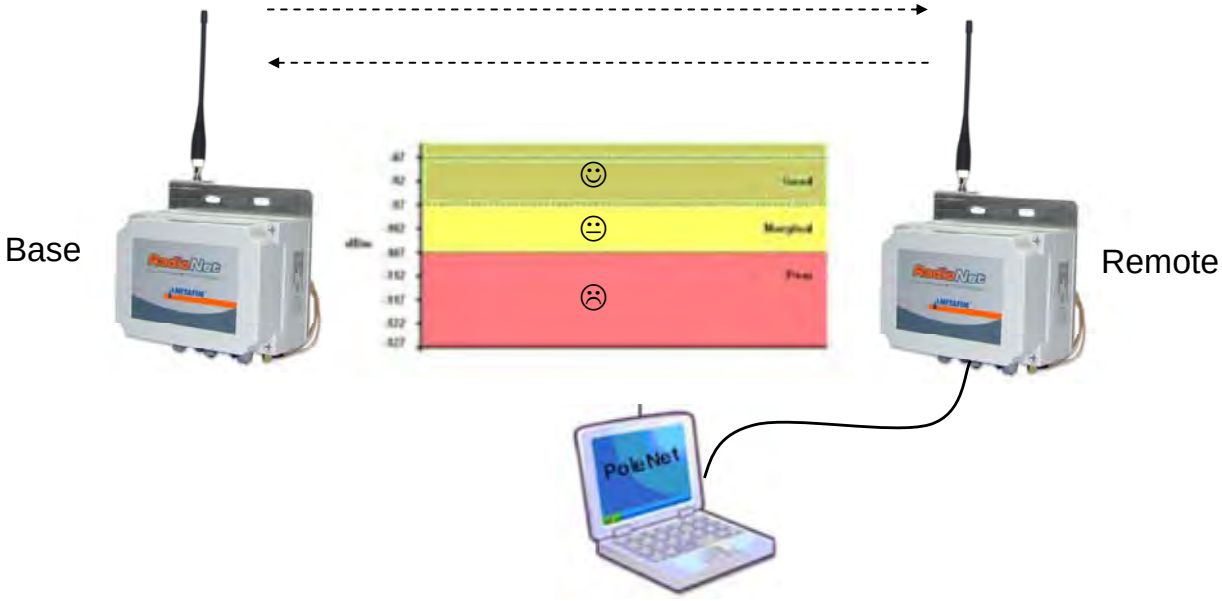
- Configuration tools for the RadioNet & SingleNet Hardware.
- Local & remote diagnostic tools for the RadioNet & SingleNet Hardware.
- Conducting radio survey analysis for the RadioNet System.



Configuration tools include programming of the radio, mapping, network management and setting alarm levels.

Diagnostics tools include the testing of digital inputs and outputs, monitoring signal strengths, battery voltages and operating temperatures.

As RF signals are invisible, the PoleNet PC software provides us with additional user friendly tools to assist in designing and managing and diagnosing RF networks.



3. Quick Start Guide

The Quick start guide is intended for advanced operators who only require a logical sequence to follow.

3.1. Quick Start Guide – Remote Unit Pre Installation

Check Wiring

Power Up Remote Unit and view diagnostic LED

Note: LED function is disabled when RS232 communication port is active.

Configure Remote Unit: frequency, transmit power, battery voltage alarm levels and I/O configurations

3.2. Quick Start Guide – Base Unit

Check Wiring

Power Up Base Unit and view diagnostic LED's

Note: LED function is disabled when RS232 communication port is active.

Configure Base Unit: frequency, transmit power and battery voltage alarm levels

Draw site map with ESN locations and I/O capacity

Define SAF Unit ID and locations

Create Route Map text file

Load Route Map & confirm

3.3. Quick Start Guide – Host Unit

Reset Host Unit

View available Networks to confirm

View Routing and Unit ID's to confirm network structure as per Route Map

3.4. Quick Start Guide – Remote Unit Post Installation

Check Wiring of Power, solar panel orientation (if applicable), Digital Inputs, Digital Outputs, and antenna connection for firmness

Power Up Remote Unit and view diagnostic LED

Note: LED function is disabled when RS232 communication port is active.

View battery voltage level and test digital inputs and digital outputs.

Note: When unit is powered up, all the digital outputs will close in sequence, 1,2,3,etc.

3.5. Quick Start Guide – Host Unit Post Installation

Define System Parameters

- Configure “Refresh remotes” time
- Configure “Digital output delay” time

Clear Capture & Reset Host unit

Note: Clear Capture resets Captured information and controller I/O mapping configurations.

Capture Data

Select Control Mode

Configure Controller

- Complete RadioNet Host to Controller Mapping form
- Define communication settings
- Define digital output mapping
- Define digital input mapping
- Save backup data and program Host Unit

Test I/O via Host (excludes controller I/O function)

Note: Make sure communication cable between Host and controller is disconnected.

Test via Controller

Note: Make sure communication cable between Host and controller is connected.

4. PC Communication Connections

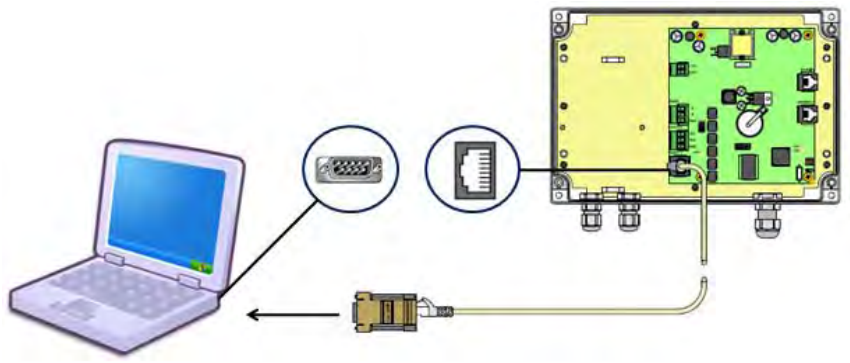
4.1. PC Specifications

	Description
Operating System:	Windows 98, ME, 2000, NT, XP, Vista
Processor:	Pentium IV 1.6 GHZ – Minimum
Memory:	500 MB RAM – Minimum
Graphics Display:	XGA resolution capable (1024 x 768, 65000 colours)
Serial Port:	1 free serial port preferred 1 free USB port with USB to serial converter (optional)
Hard Drive:	2 GB available free space - Minimum

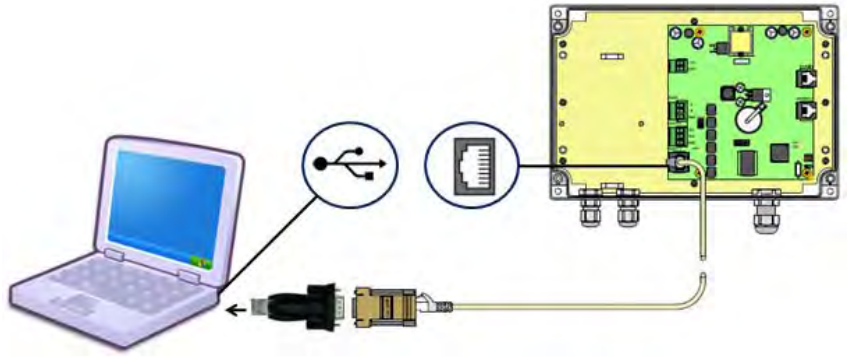
4.2. PC Communication Connection to RadioNet Host Unit

Step 1 Connect communication lead

Option 1.A Host Unit - Direct communication connection via Serial Port (DB9 Male)



Option 1.B Host Unit - Direct communication connection via USB Port

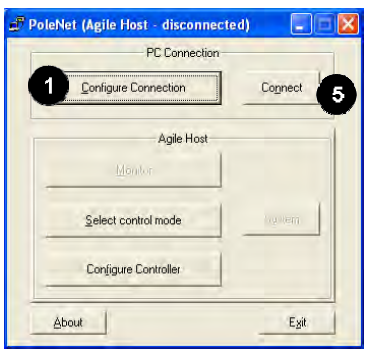


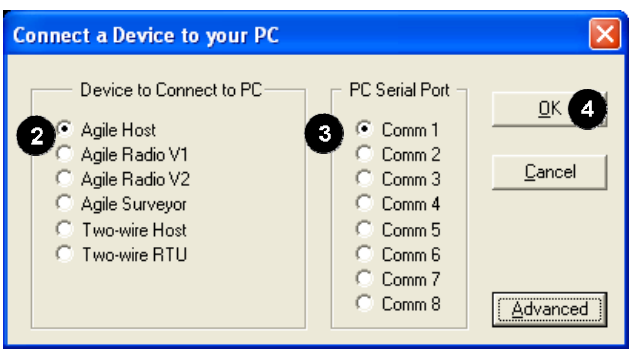
Step 2 Start PoleNet PC Software

Note: Disable any device or software program that may conflict with the use of your serial port

Step 3 Configure connection & connect

3.1 Select Configure Connection Button
3.2 Select device to connect to PC - Agile Host
3.3 Select serial port number
3.4 Select OK button
3.5 Select Connection Button

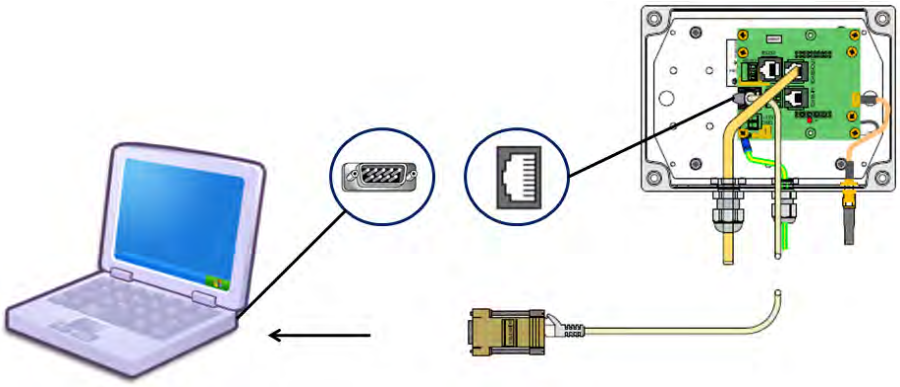




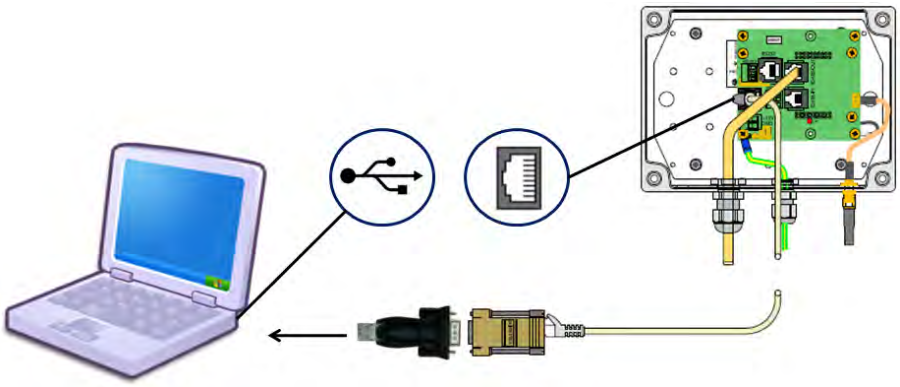
4.3. PC Communication Connection to RadioNet Base Unit

Step 1 Connect communication lead

Option 1.A Base Unit - Direct communication connection via Serial Port (DB9 Male)



Option 1.B Base Unit - Direct communication connection via USB Port

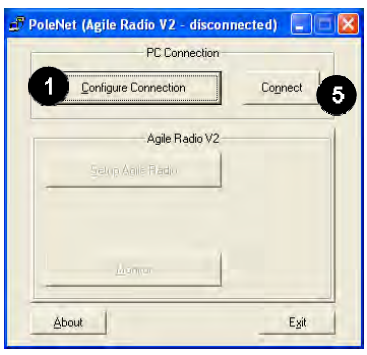


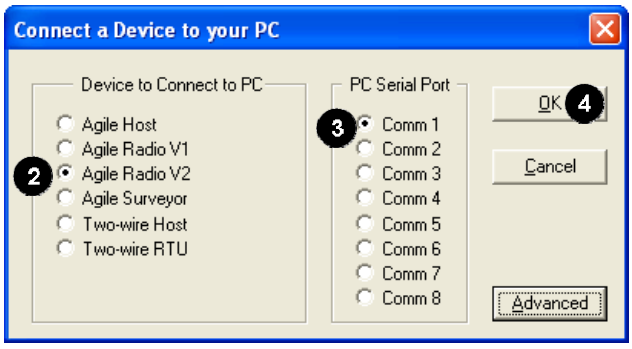
Step 2 Start PoleNet PC Software

Note: Disable any device or software program that may conflict with the use of your serial port

Step 3 Configure connection & connect

3.1 Select Configure Connection Button
3.2 Select device to connect to PC - Agile Radio V2
3.3 Select serial port number
3.4 Select OK button
3.5 Select Connection Button

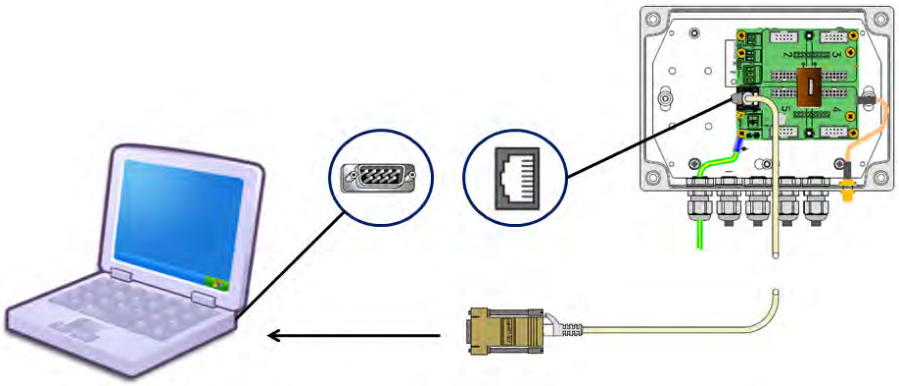




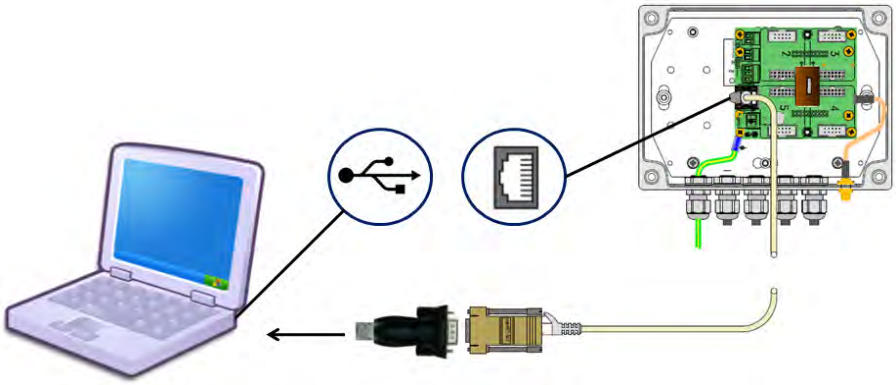
4.4. PC Communication Connection to RadioNet Remote Unit

Step 1 Connect communication lead

Option 1.A Remote Unit - Direct communication connection via Serial Port (DB9 Male)



Option 1.B Remote Unit - Direct communication connection via USB Port

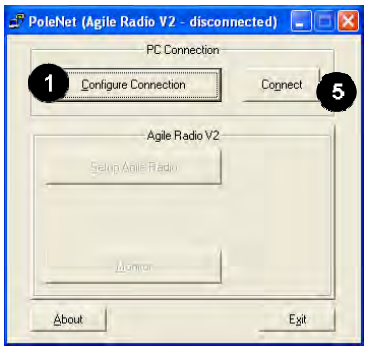


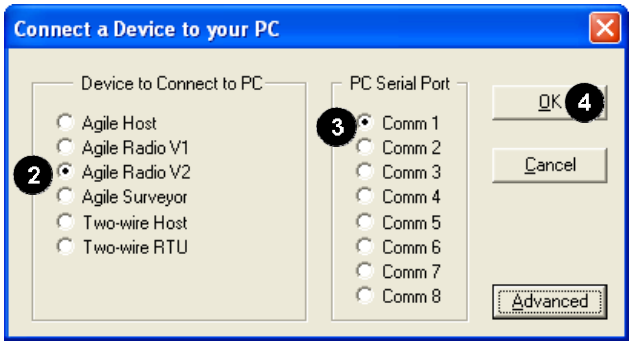
Step 2 Start PoleNet PC Software

Note: Disable any device or software program that may conflict with the use of your serial port

Step 3 Configure connection & connect

3.1 Select Configure Connection Button
3.2 Select device to connect to PC - Agile Radio V2
3.3 Select serial port number
3.4 Select OK button
3.5 Select Connection Button

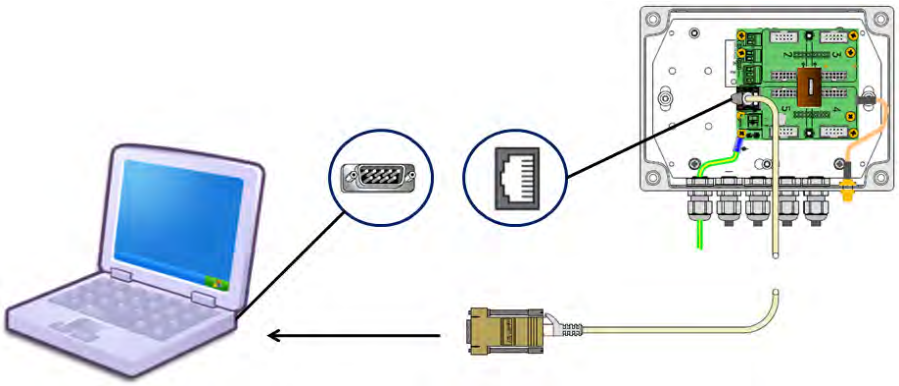




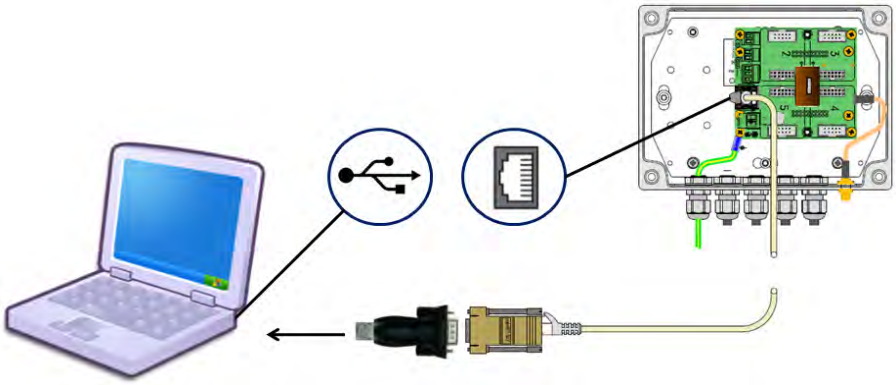
4.5. PC Communication Connection to RadioNet Survey Unit

Step 1 Connect communication lead

Option 1.A Remote Unit - Direct communication connection via Serial Port (DB9 Male)



Option 1.B Remote Unit - Direct communication connection via USB Port

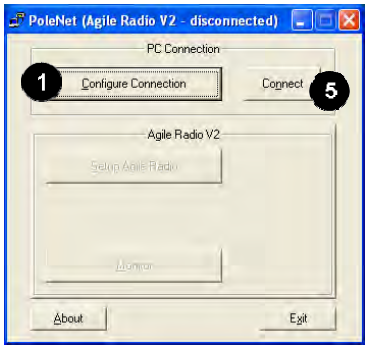


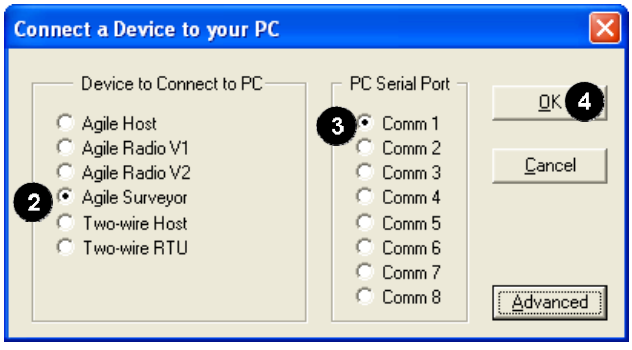
Step 2 Start PoleNet PC Software

Note: Disable any device or software program that may conflict with the use of your serial port

Step 3 Configure connection & connect

3.1 Select Configure Connection Button
3.2 Select device to connect to PC - Agile Surveyor
3.3 Select serial port number
3.4 Select OK button
3.5 Select Connection Button





4.6. PoleNet Advanced Mode

Important functions and commands that can cripple the RadioNet system are hidden from day to day operations.

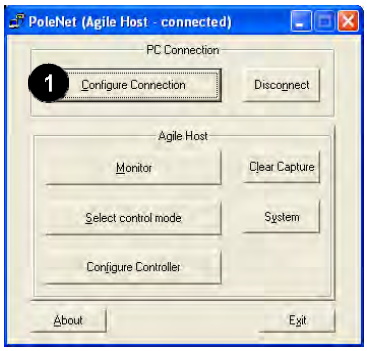
The advance mode is used to activate important dialog boxes and command buttons such as:

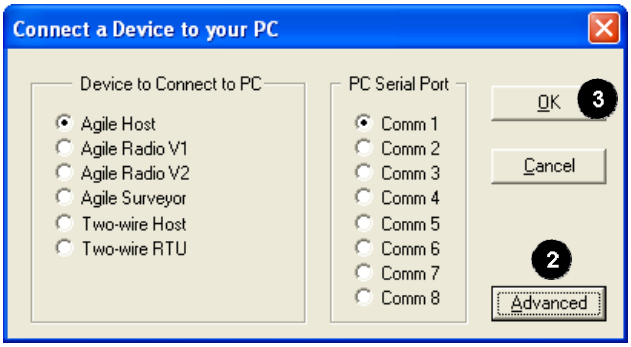
- System Capture
- Clear Capture
- Testing of outputs

Only accredited RadioNet Technicians should use the advanced features and once the commissioning and testing phase has been completed, the advanced features should be deactivated.

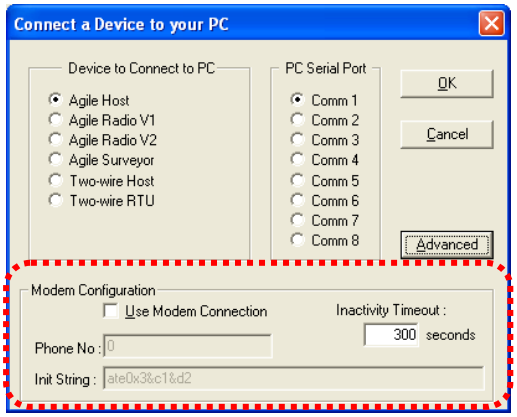
Step 1 Start PoleNet Software

1.1 Select “Configure Connection” Button
1.2 Select “Advanced” Button
1.3 Select OK button





Note: When advance mode is active, you will see Modem Configuration dialog box appear



5. Configuration Guide Lines

5.1. Configuration – Remote Unit Pre Installation

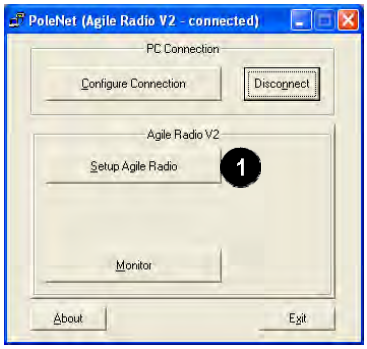
Step 1 Confirm Radio Frequency for this project.

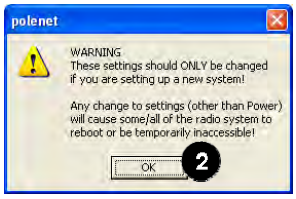
Step 2 Compile Site Map

Step 3 Setup programming bench

Step 4 Connect communication cable between PC and Remote unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.4)

Step 5 Access Agile Radio – Remote Settings
5.1 Select Setup Agile Radio Button
5.2 Select OK button to confirm Warning

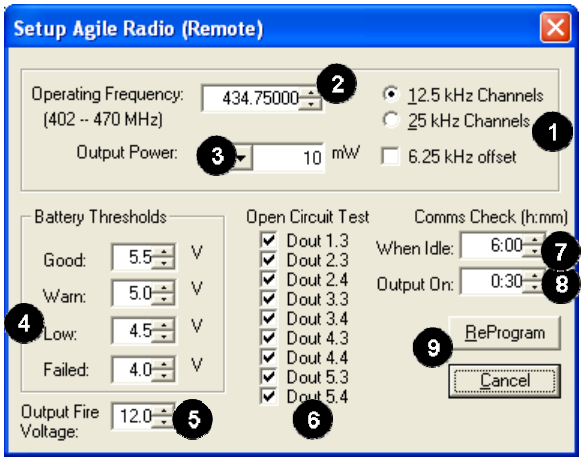



polenet
WARNING
These settings should ONLY be changed if you are setting up a new system!
Any change to settings (other than Power) will cause some/all of the radio system to reboot or be temporarily inaccessible!
OK
2

Step 6 Setup Agile Radio – Remote Unit

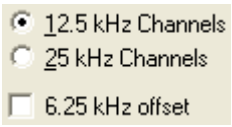
Note: All numeric settings must be performed by using the Up or Down arrows.

6.1 Select Channel Spacing & Offset (if applicable)
6.2 Define Operating Frequency
6.3 Define Output Power
6.4 Define Battery Thresholds
6.5 Define Output Firing Voltage
6.6 Enable/Disable Open Circuit Detection
6.7 Define Comm. check interval when outputs are Idle
6.8 Define Comm. check interval when outputs are Active
6.9 Select Reprogram Button or Cancel



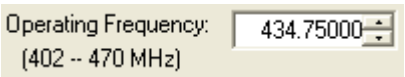
5.1.1. Setup Agile Remote Radio Settings Definitions

Channel Spacing & Offset:



The channel spacing is configurable to either 12.5 kHz or 25 kHz. The channel spacing setting (default 12.5 KHz) determines the next frequency increment.
For those countries that support channel spacing of 6.25 kHz, then selecting the 6.25 kHz offset will enable the center frequency to offset by 6.25 kHz.

Operating Frequency:



The Agile Radio's operating frequency is software configurable between 402 MHz and 470 MHz. The programmed frequency must comply with either your local or national RF spectrum licensing organisation.

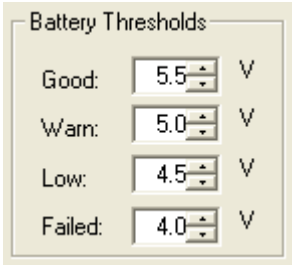
Note: All RadioNet Remotes and the RadioNet Base must all be set to the same frequency.

Output Power:

The Agile Radio's operating power is software configurable between 1mW and 500 mW. The Output power setting should be equal or less than that defined by the radio license parameters that you are operating under.

Note: If the power setting is above 10mW, do not power up the RadioNet without an antenna connected.

Battery Thresholds:



Four Battery alarm thresholds can be set to advise the RadioNet Host when different battery voltage levels are sensed. While on the network, crossing any of these thresholds causes the Host unit to be notified.

Good: Battery voltage is OK.

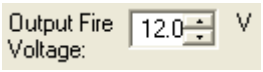
Warn: Battery voltage has reached the "warning level", should a rechargeable power supply be installed, further investigation would be required to determine why the battery voltage can't be maintained at a good level. IE: The solar panel might need cleaning or rechecking for correct orientation.

Low: Battery voltage has reached the "low" level, should a rechargeable power supply be installed, further investigation would be required to determine why the battery voltage can't be maintained at a good level. IE: The solar panel might need cleaning or rechecking for correct orientation.

Failed: Battery voltage has dropped below the "Failed" threshold. The RadioNet Remote sends an alarm message and then turns off all outputs, stops monitoring the inputs, turns off the radio and goes into hibernation, periodically awakening to check if the battery voltage has recovered.

Note: Please refer to the Diagnostic section to view the current battery voltage level.

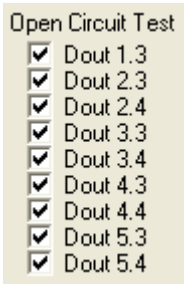
Output Firing Voltage:



The Output firing voltage (default 12 VDC) is user configurable between 9 – 16 VDC. This setting is a global setting and effects all the outputs within the RadioNet Remote unit to which you are connected. When non standard solenoids and relays are being used, please contact Netafim Technical Support for further assistance.

Note: Please refer to the Diagnostic section for testing of the digital outputs.
Note: Refer to annex A for Solenoid & Relay compatibility list.

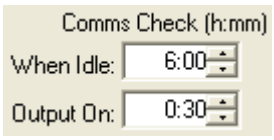
Open Circuit Detection:



Each output of the RadioNet Remote has Open Circuit (O/C) detection enabled as default. When ever the output is activated the RadioNet checks to see if a solenoid or relay has been connected. If no device has been detected, the RadioNet will send an alarm message to the RadioNet Host and will also display the status in PoleNet monitor mode. Should a non standard solenoid or relay be used and the open circuit alarm condition is unwarranted, then the user can disable that particular individual output.

Note: Please refer to the Diagnostic section for testing of the digital outputs.
Note: Refer the annex B for correlation between the output address and physical output location.

Comm. Check:



A communication check between the RadioNet Remote and its Master can be user defined. There are two independent intervals which are user configurable.

Note: The Master can be either the base Unit or a SAF Remote Unit.

When idle: Configurable between “Off” and 36 hours

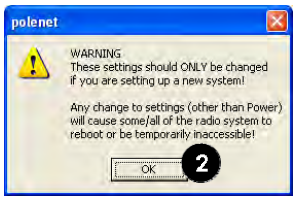
Output On: Configurable between “Off” and 2 hours 15 minutes.
Should an output be active and the Remote unit loses communication with its master within the defined time limit, The Remote unit will close down all active outputs until re-connection is established.

5.2. Configuration – Base Unit

5.2.1. Setup Agile Base Radio Settings

Step 1 Connect communication cable between PC and Base unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.3)

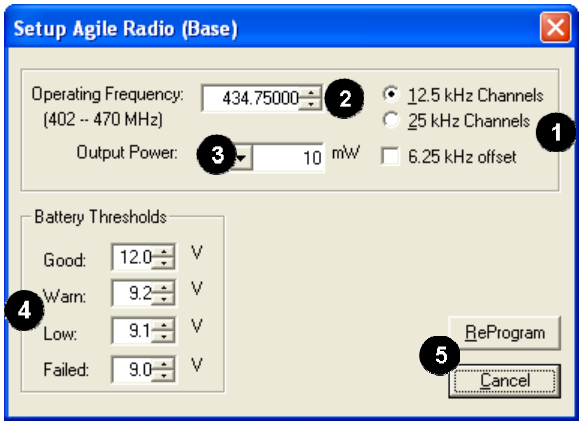
Step 2 Access Agile Radio – Base Settings
2.1 Select Setup Agile Radio Button
2.2 Select OK button to confirm Warning


polenet
WARNING
These settings should ONLY be changed if you are setting up a new system!
Any change to settings (other than Power) will cause some/all of the radio system to reboot or be temporarily inaccessible!
OK
2

Step 3 Setup Agile Radio – Base unit

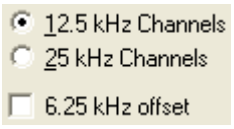
Note: All numeric settings must be performed by using the Up or Down arrows.

3.1 Select Channel Spacing & Offset (if applicable)
3.2 Define Operating Frequency
3.3 Define Output Power
3.4 Define Battery Thresholds
3.5 Select Re Program Button or Cancel



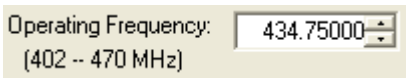
5.2.2. Setup Agile Base Radio Settings Definitions

Channel Spacing & Offset:



The channel spacing is configurable to either 12.5 kHz or 25 kHz. The channel spacing setting (default 12.5 KHz) determines the next frequency increment.
For those countries that support channel spacing of 6.25 kHz, then selecting the 6.25 kHz offset will enable the center frequency to offset by 6.25 kHz.

Operating Frequency:



The Agile Radio's operating frequency is software configurable between 402 MHz and 470 MHz. The programmed frequency must comply with either your local or national RF spectrum licensing organisation.

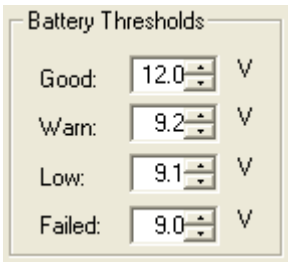
Note: All RadioNet Remotes and the RadioNet Base must all be set to the same frequency.

Output Power:

The Agile Radio's operating power is software configurable between 1mW and 500 mW. The Output power setting should be equal or less than that defined by the radio license parameters that you are operating under.

Note: If the power setting is above 10mW, do not power up the RadioNet without an antenna connected.

Battery Thresholds:



Four Battery alarm thresholds can be set to advise the RadioNet Host when different battery voltage levels are sensed. While on the network, crossing any of these thresholds causes the Host unit to be notified.

Good: Battery voltage is OK.

Warn: Battery voltage has reached the “warning level”, should a rechargeable power supply be installed, further investigation would be required to determine why the battery voltage can’t be maintained at a good level. IE: The solar panel might need cleaning or rechecking for correct orientation.

Low: Battery voltage has reached the “low” level, should a rechargeable power supply be installed, further investigation would be required to determine why the battery voltage can’t be maintained at a good level. IE: The solar panel might need cleaning or rechecking for correct orientation.

Failed: Battery voltage has dropped below the “Failed” threshold. The RadioNet Remote sends an alarm message and then turns off all outputs, stops monitoring the inputs, turns off the radio and goes into hibernation, periodically awakening to check if the battery voltage has recovered.

Note: Please refer to the Diagnostic section to view the current battery voltage level.

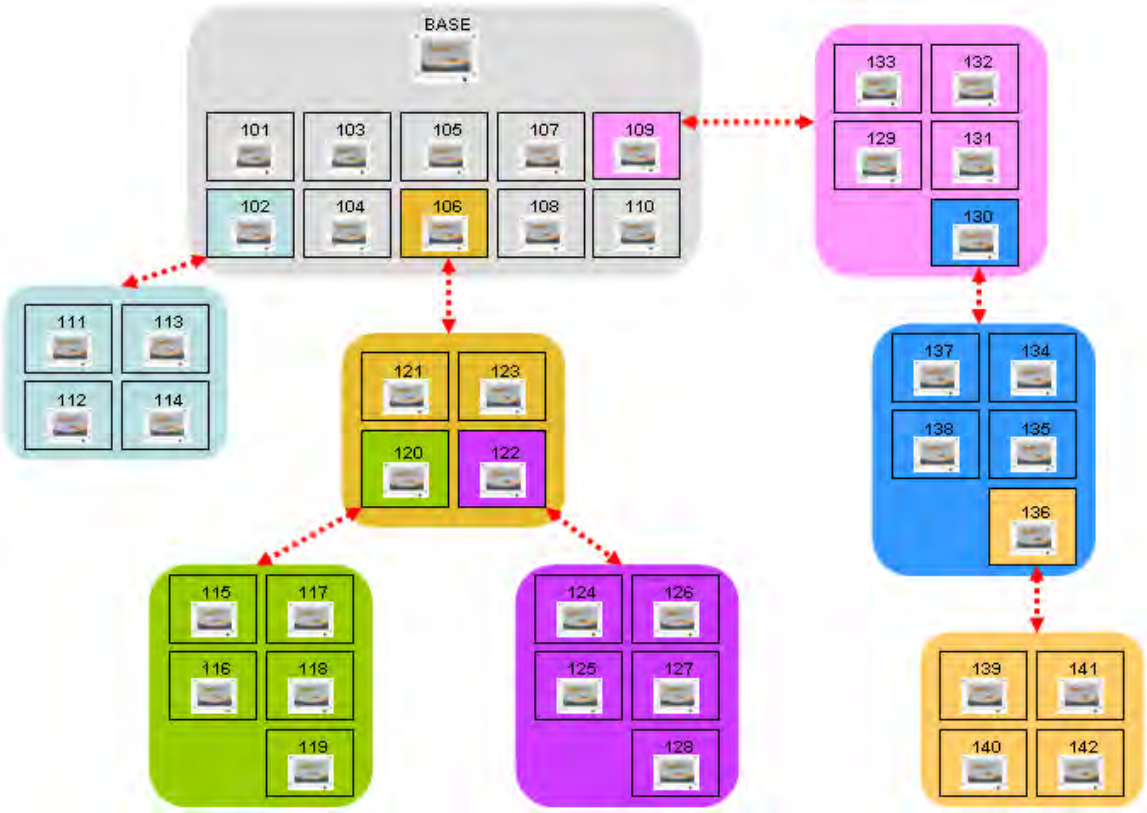
5.2.3. Base Unit - Route Map

A Route Map is a data file that explains who is part of this wireless network and automatically configures their function. Since the network consists of one or more remote units, each unit must be given a unique ID. The ID of each unit is derived from a unique electronic serial number called an ESN. The ESN number becomes part of the unit's identification (ID).

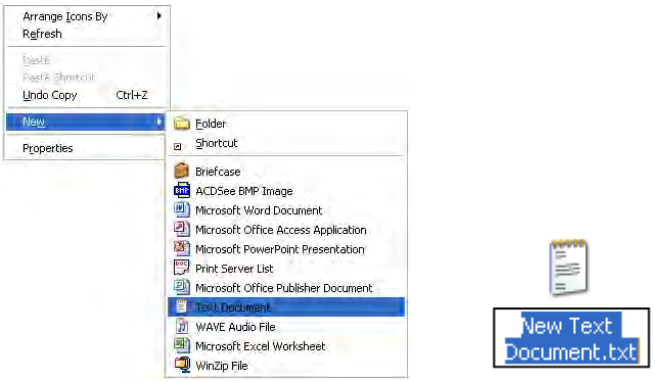
A Route Map is generated from a text file and programmed into the RadioNet Base unit via the PoleNet PC Software. Once the Route Map has been programmed, the RadioNet Base unit transmits a message to all units to perform a reset. Once the network has been reset, the Remotes units will start to report into the RadioNet Base unit to see if they have any additional functions to perform, such as to act as a Store and Forward Remote unit (SAF).

The wireless network synchronizes to a preset cycle time. The cycle time is determined by the number of remote units and the number of layers within the network. The cycle time may vary between 4, 8, 16 and 32 seconds.

Step 1 Draw a site map and mark the location of the Remote unit ID. This site map should include those units that have been defined to act as SAF Remote units



Step 2 Open up a blank text file.
(right mouse click on your desktop, select New, Text Document).
An icon will appear on the desktop which requires you to give the document a new name.



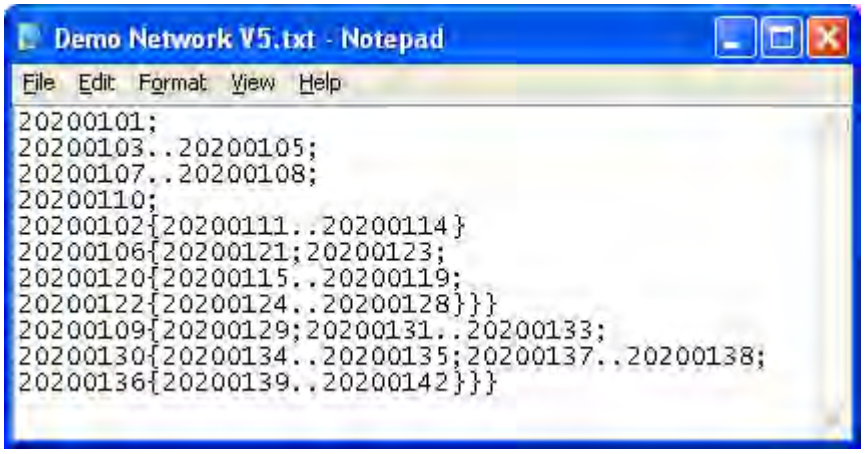
Step 3 Open the blank text document and enter the units ESN numbers.
The network layout is determined by the location and order of certain symbols.

The semicolon **;** is inserted at the end of a Remote units ID (individually listed units).
EG: **20200101;**
20200102;

Where you have consecutive ESN's, you may add **..** between the Remote units ID (signifying a range).
EG: **20200103..20200105;**

To designate a Store and Forward Remote unit (SAF), it must not be part of a range, and should be followed by an opening brace, the list of Remote units it is responsible for, and a closing brace. EG:
20200102{20200111..20200114}

Store and Forward Remote units (SAF) can be nested allowing multiple SAF Remote units in series (layers).
EG: **20200106{20200121;20200123;**
20200120{20200115..20200119;
20200122{20200124..20200128}}}



3.1 Save file.

Step 4 Connect communication cable between the PC and Base Unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.3)

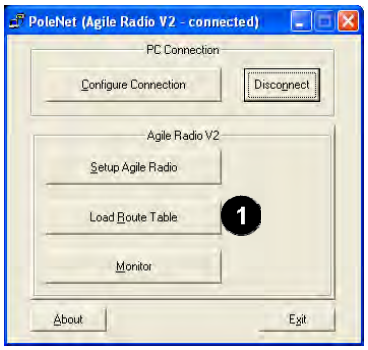
Note: Advanced mode must be selected. (refer chapter 4.6)

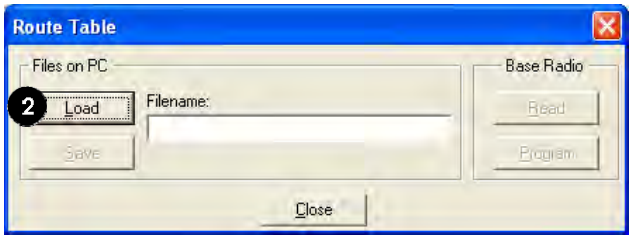
Step 5 Access Agile Base Radio – Load Route Table

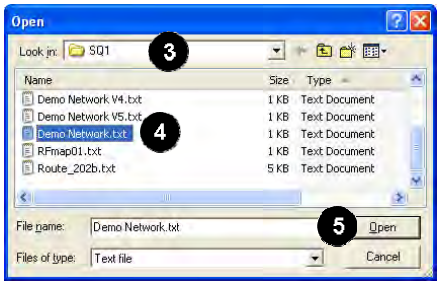
5.1 Select “Load Route Table” Button
5.2 Select Load Button
5.3 Select file location of stored Route Map
5.4 Select route map text file
5.5 Select Open button
5.6 Select Load button
5.7 Confirm the file has loaded correctly without any errors.
Correct errors if any, then reload.
5.8 Select the Program button to download route map file into RadioNet Base
Confirm that the route data has been programmed successfully

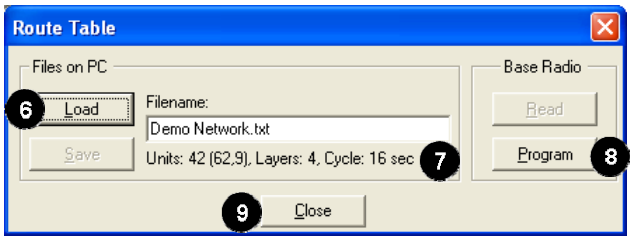
Note: It maybe necessary to repeats steps 2 to 8 until you confirm route data has been programmed successfully.

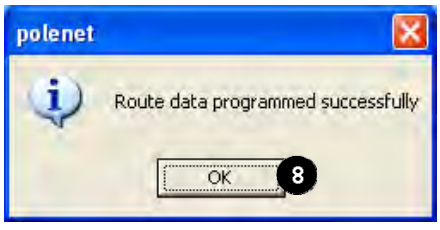
5.9 Select Close Button when completed.







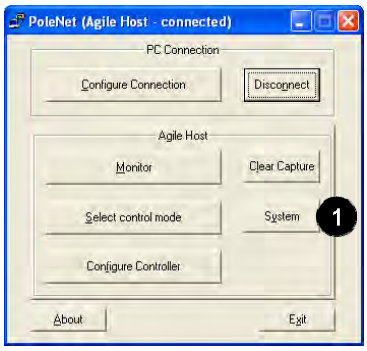




5.3. Configuration – Host Unit

Step 1 Connect communication cable between PC and Host unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.2)

Step 2 Access Agile Host – System
2.1 Select System button



Step 3 Configure Host Unit system settings
3.1 Define Refresh Remotes interval
3.2 Define Digital Output delayed activation time
3.2 Select the OK button to confirm changes

5.3.1.1. Definitions of Host Unit – System Settings

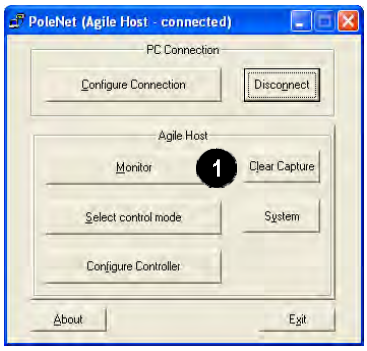
Refresh Remotes: The refresh remotes time is the interval in which the Host Unit will force a communication (poll) with each of the Remote Units. This setting ranges from “Off” to a maximum time of “4 hours 15 minutes”. The default interval is set to “Off”.

Note: A more frequent setting will cause an increase in battery consumption in the Remotes Units.

Dout delay: As the communication with the Remotes Units are synchronized within each communication cycle time (4,8,16 or 32 seconds), digital output activations are typically random over the communication cycle time. By defining a digital output delay time, all the Remote Unit’s will delay the activation until the master synchronization delay time.

EG: All the Remote Units know the master time. If the Dout delay was set to 30 seconds, the controller sends it’s command to the Host Unit, which in turn, sends a signal to several Remote Units to turn on. Each Remote Unit would delay there activation until the master time was reached, therefore all the valves would typical turn on at the same period of time, approximately 30 seconds after the master controller initiated the command.
This setting ranges from “Off” to a maximum time of “15 minutes and 45 seconds”. The default delay time is set to “Off”.

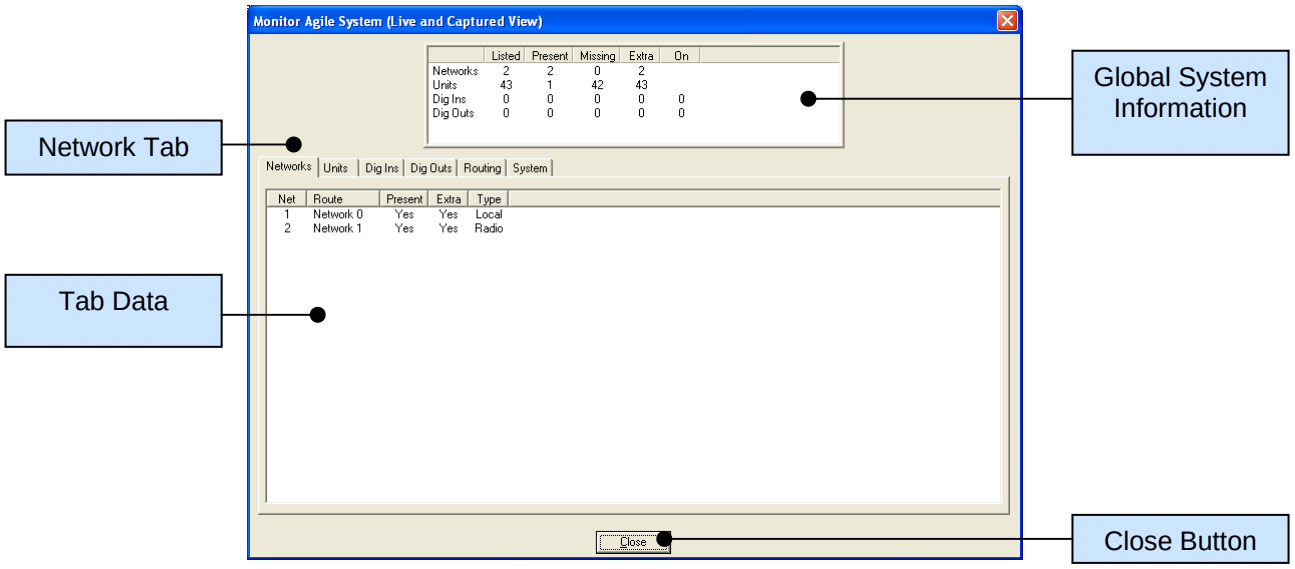
Step 2 Access Agile Host – Monitor
2.1 Select Monitor button



Step 3 Select “Networks” Tab

The monitor window provides an overview of the complete RadioNet system as viewed from the RadioNet Host unit and Base unit.
Prior to configuring the RadioNet Host unit, we need to make sure that the route map data that has been entered into the Base unit is also viewed correctly via the RadioNet Host Unit.

The screen is divided into 2 main sections.
The top portion of the display is Global System Information as viewed from the Host Unit and Base unit, while the bottom portion displays information relating to tab selected, in this example the Tab Data displays the available networks.


Monitor Agile System (Live and Captured View)
Listed Present Missing Extra On
Networks 2 2 0 2
Units 43 1 42 43
Dig Ins 0 0 0 0 0
Dig Outs 0 0 0 0 0
Networks Units Dig Ins Dig Outs Routing System
Net Route Present Extra Type
1 Network 0 Yes Yes Local
2 Network 1 Yes Yes Radio
Close
Network Tab
Tab Data
Global System Information
Close Button

5.3.1.2. Definitions of Host Monitor Mode – Networks Tab

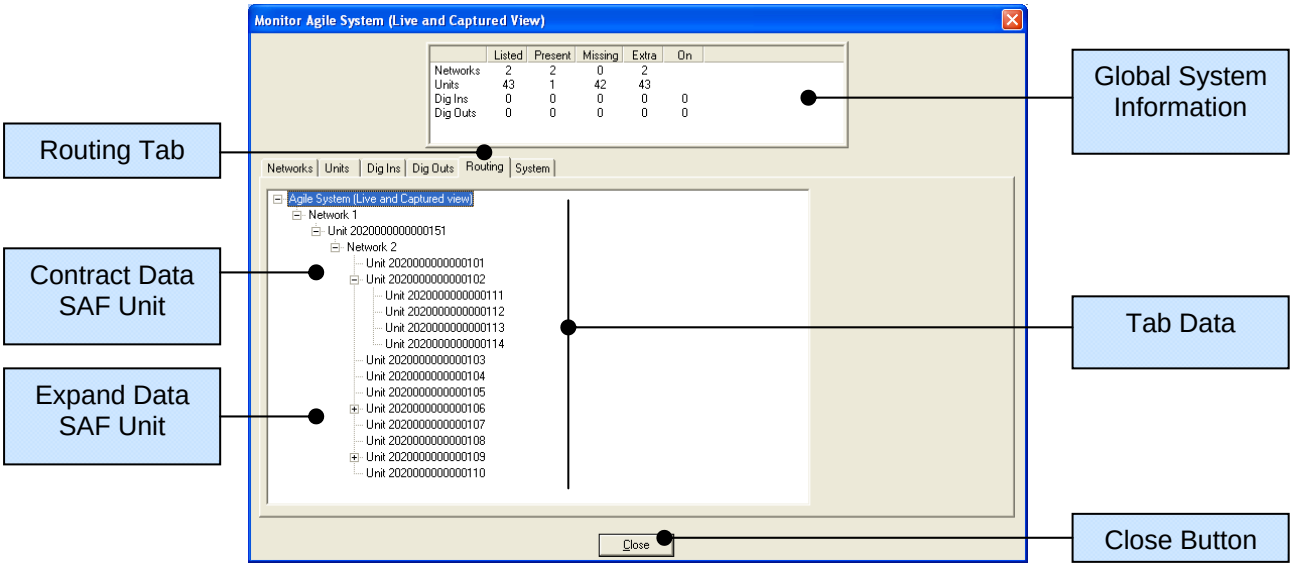
Listed:	Displays the total number of devices (networks, units, I/O) that is theoretically available to both the Host unit and the RadioNet Base unit. **Note:** The Base Radio unit is included as both a network and as a Remote unit. **Note:** The quantity of units is derived from the base unit plus the numbers of Remote units defined in the route map.
Present:	Displays the total number of active devices (networks, units, I/O) that are currently connected to the Host unit and the Base unit, either physically or via the wireless network.
Missing:	Displays the total number of devices (networks, units, I/O) that are captured, but the Host unit or Base unit has not made a connection with.
Extra:	Displays the total number of devices (networks, units, I/O) as defined in the Host unit and Base unit that has not been captured.
On:	Displays the total number of digital inputs and digital outputs that are currently “ON” within the system
Network Tab:	Displays the status of the networks that are accessible
Units Tab:	Displays the status of the defined units, both Base unit and Remotes units that are accessible
Routing Tab:	Displays both the Network configuration and routing configuration as seen by both the Host unit and Base unit.

Step 4 Select “Routing” Tab

The routing window provides an overview of the complete RadioNet system as viewed from the RadioNet Host unit and Base unit
This information is derived from the route map that has been previously programmed into the RadioNet Base unit.

The RadioNet Technician should confirm that the data displayed in the routing screen is identical to the site map which has been compiled earlier.

Note: Please confirm that the Host unit has been reset since the Route Map was downloaded into the Base unit.
Note: Please allow up to 45 seconds after resetting Host unit.



5.4. Configuration – RadioNet Remotes Unit Post Installation

Step 1 Confirm all wiring and connections such as power, solar panel orientation (if applicable), digital inputs, digital outputs and antenna connections.

Note: Refer to Installation Manual for correct wiring guide.

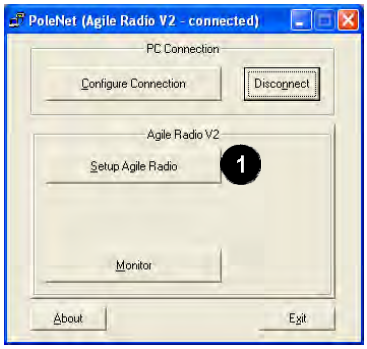
Step 2 Power up Remote unit and view diagnostic LED functions.

Step 3 Monitor sequence of solenoid's turning off…

Note: If solenoid or relay is already de-energized, you may not hear or see a change of state.

Step 3 Connect communication cable between PC and Remote unit, start PoleNet PC software, configure connection, select Advanced Mode and connect. (refer chapter 4.4)

Step 4 Access Agile Radio – Monitor mode
4.1 Select "Monitor" Button

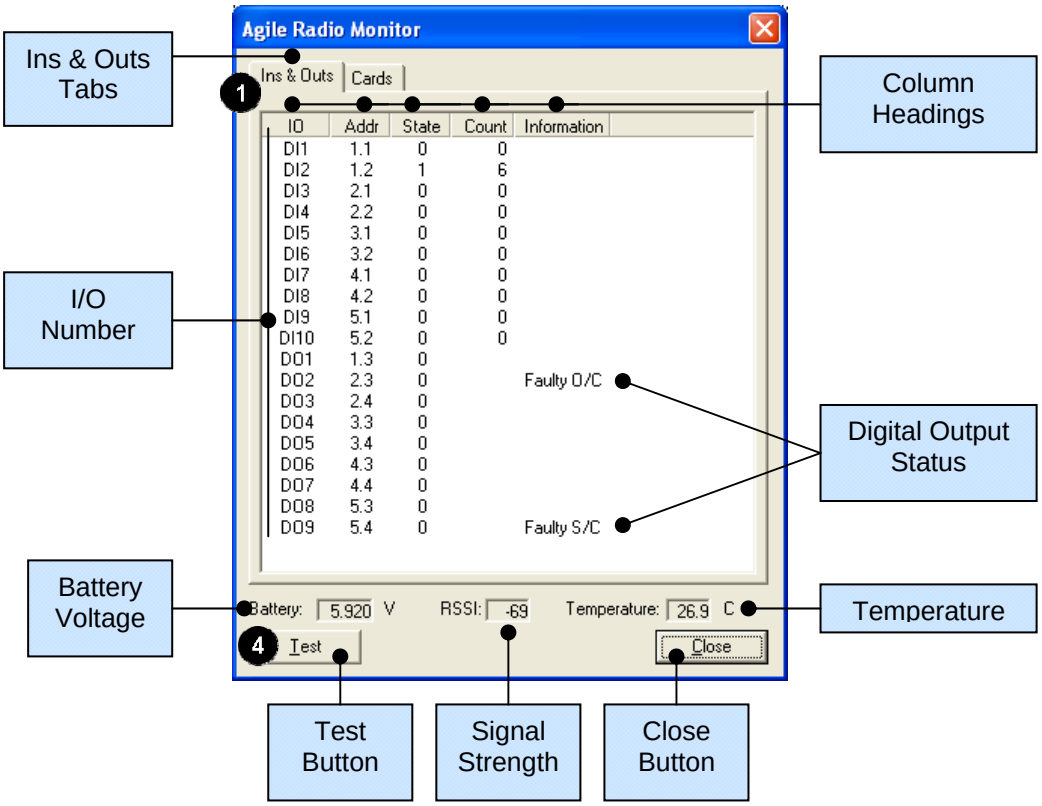


Step 5 Testing digital inputs and digital outputs

5.1 Select “Ins & Outs” Tab

The list displays the current number of inputs and outputs that correlates to the number and type of hardware that is connected and functional.

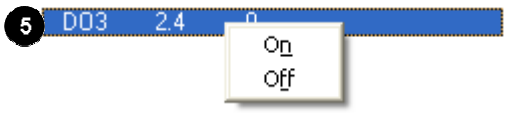
5.2 Test digital inputs by causing a change of state and viewing the status change in the monitor screen.



5.3 Test digital outputs

5.4 Select the “Test” button to enable the testing mode for the digital outputs.

5.5 Write mouse click on the required digital output number to open a manual command dialog box. Select the mode of operation either “On” to activate the digital output or “Off” to deactivate the digital output.



Note: The RadioNet Technician should confirm both the operation and that the solenoid or relay is wired to the correct corresponding digital output number.

5.6 Confirm that the battery voltage is within specified guidelines.

5.4.1.1. Definition of Radio Remote Monitor – Ins & Outs Tab

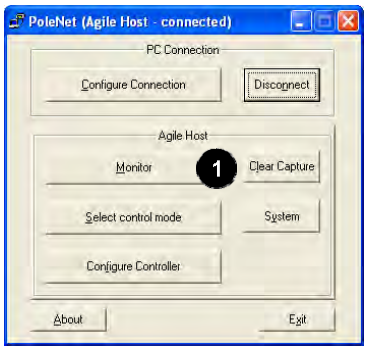
IO:	Logical Input/Output number available As the I/O expansion cards are plug & play, the I/O number will only appear when the I/O card is inserted and recognized.
Addr:	Physical Address of the I/O available. This address will be used for mapping of the RadioNet I/O to the host controllers I/O.
State:	Current status of the Input/Output. **Inputs:** 0 = OFF (open circuit) 1 = ON (closed circuit) **Outputs:** 0 = OFF (closed/idle) 1 = ON (open/active)
Count:	Total number of inputs (pulses) counted **Note:** Input counted from trailing edge of pulse.
Information:	Status of the command or state. **Override:** Output manually activated. **Faulty O/C:** Output detected that there is no solenoid or relay connected. **Faulty S/C:** Output detected that there is a Short Circuit.
Battery:	Current battery voltage level sensed by the RadioNet Remote unit.
RSSI:	Return Signal Strength Indicator displayed in dBm. This is the signal strength recorded coming from the Master of this Remote unit. IE: the received signal strength. **Note:** If the remote has no master, then the RSSI value represents the noise floor.
Temperature:	The current temperature reported of the internal radio board.
Test Button:	Selecting the Test Button puts the Remote unit in testing mode. Right mouse click on the DO number will activate a manual command list “On” or “Off”, giving the operator the option to manually operate the digital output. **Note:** Manual operation temporary overrides the Host unit operation and may generate a host controller alarm. **Note:** Disconnecting the communication cable from the Remote unit will automatically restore any manually overridden digital outputs.

5.5. Configuration – RadioNet Host Unit Post Installation

Step 1 Connect communication cable between PC and Host unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.2)

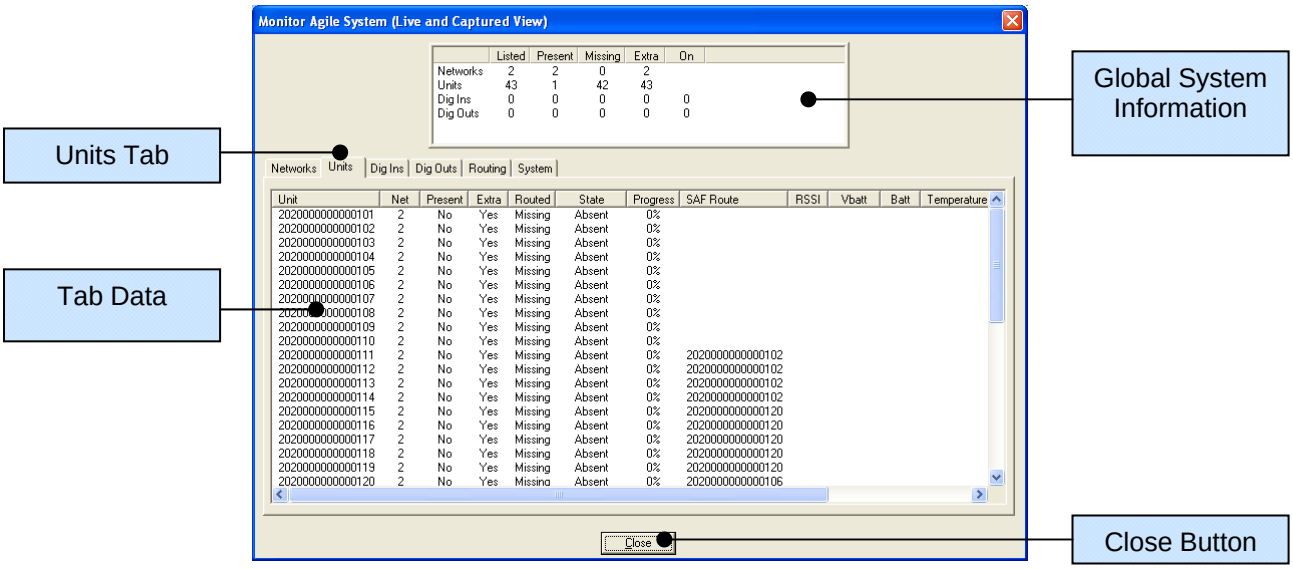
Step 2 Access Agile Host – Monitor

2.1 Select Monitor button



Step 3 Select “Units” Tab

The monitor window provides a status overview of the Base unit and Remote Units as viewed from the RadioNet Host unit and Base unit. Status information includes network, mapping, routing, signal strength, battery voltage, battery condition, unit temperature and firmware version.



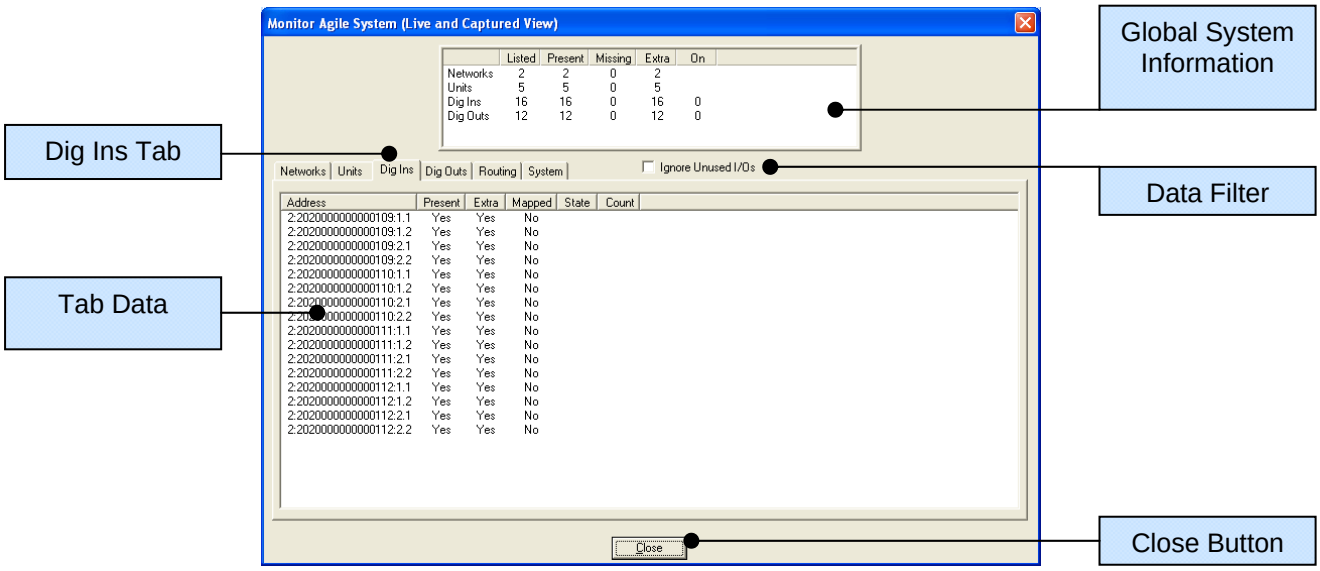
5.5.1.1. Definitions of Host Monitor Mode – Units Tab

Unit:	Displays the Electronic Serial Number (ESN) of all the units that have been configured in the route map.
Net:	Displays which network the unit belongs too.
Present:	Displays the current status of the unit, whether the unit is on-line or off-line. **No = Unit is off-line** **Yes = Unit is on-line & available**
Extra:	Displays the current status of the unit, whether the unit is available, or has not yet been captured. **No = Unit has been captured** **Yes = Unit has not been captured**
Routed:	Displays the current status of the unit, whether the unit is on-line or off-line. **Missing = Unit is off-line** **Yes = Unit is on-line & available** **Orphan = Unit that has been adopted in the allowed list of the base (old route map), but not included in the new route map** **Rogue = Unit that has been adopted by the Host (old route map) and is not on the allowed list of the base.** **Note:** If you see Orphan's or Rogue's, a Host unit reset should be performed.
State:	Displays the status of the unit. **Absent = Unit is off-line** **Get I/O Cal = Unit is on-line & uploading I/O information** **Set Mode = Unit is on-line & comm. mode is being set** **Normal = Unit is on-line**
Progress:	Displays the unit's progress as it is coming on-line. **0% = Unit is off-line** **100% = Unit is on-line & available**
SAF Route:	Displays the remotes unit's communication path via a Store and Forward (SAF) Repeater which is also known as it's Master.
RSSI:	Displays the received signal strength from the view point of the remote unit. IE: the received signal strength from the remote unit's Master.
Vbatt:	Displays the current battery voltage in the remote unit. **EG: 6.543V**

Batt:	Displays the remote unit's battery condition. **Ok** = Battery okay **Warn** = Battery warning, normal charge can't be maintained **Low** = Battery voltage getting low, urgent action required **Fail** = Battery voltage is very low, unit has turned off the digital outputs and radio and is now in hibernation.
Temperature:	Displays the current internal temperature of the radio board.
Time of Data:	Displays the time and data of the last status transmission generated from the remote unit.
FW:	Displays the unit's current firmware version.
Drops:	Displays the number of communication drops **Note:** A drop is considered when the remote unit has not replied to the Base unit within 8 communication cycle times. **Note:** Drops are only counted while the PoleNet is active.

Step 4 Select "Dig Ins" Tab

The monitor window provides a status overview of all the digital inputs as viewed from the RadioNet Host & RadioNet Base. Status information includes whether the digital input is on-line or off-line, captured and mapped, current status and pulse count.



5.5.1.2. Definitions of Host Monitor Mode – Dig Ins Tab

Address: Displays the network address followed by the units Electronic Serial Number (ESN) including the physical address of the digital input.

Note: Refer to Annex B regarding digital output location.

Present: Displays the current status of the digital input, whether the input is on-line or off-line.
No **=** Digital Input is off-line
Yes = Digital Input is on-line & available

Extra: Displays the current status of the digital input, whether the input is available, or has not yet been captured.
No **=** Digital Input has been captured
Yes = Digital Input has not been captured

Mapped: Displays the current mapping status of the digital output.
No **=** Digital input has not been mapped
Yes = Digital input has been mapped

Ignore Unused I/O's: Once selected, hides all the digital inputs that are not mapped.

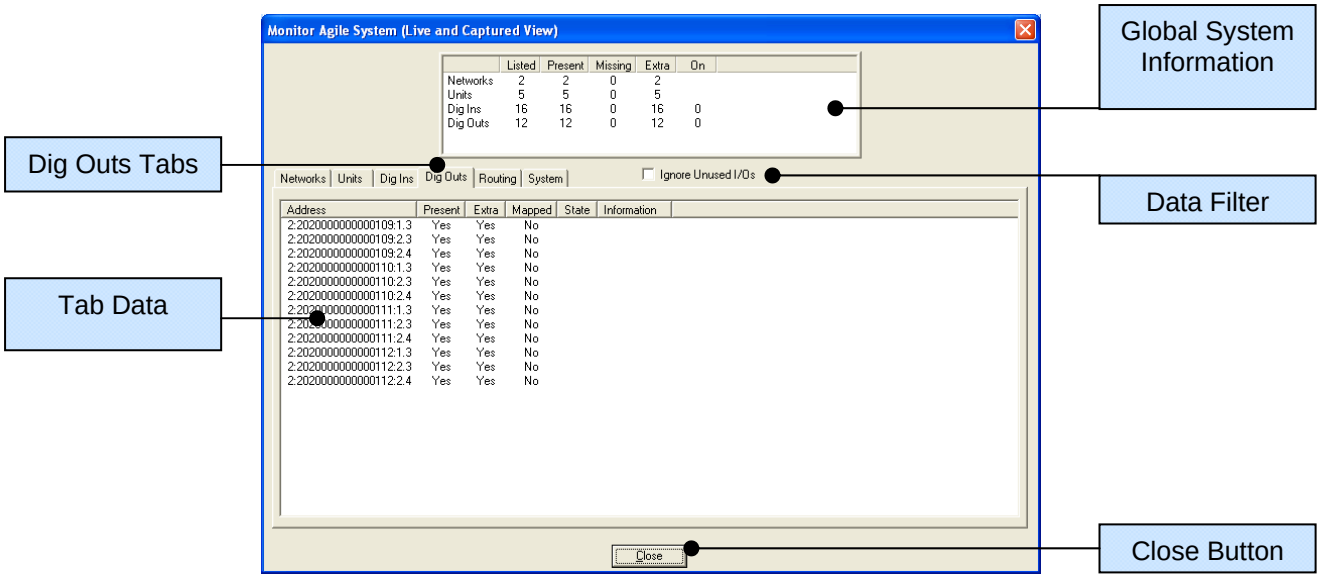
State: Displays the status of the digital input as confirmed by the remote unit.
1 **=** Input is confirmed "ON" by the Remote
No Data = Input is confirmed "OFF" by the Remote

Count: Displays the number of pulses counted by the remote

Note: The pulse count is incremented on the trialing edge of the pulse
IE: when the digital input turns off.

Step 5 Select “Dig Outs” Tab

The monitor window provides a status overview of all the digital outputs as viewed from the Host unit and Base unit. Status information includes whether the digital output is on-line or off-line, captured and mapped, current status and important information about digital output failures such as open and short circuit detection.



5.5.1.3. Definitions of Host Monitor Mode – Dig Outs Tab

Address: Displays the network address followed by the units Electronic Serial Number (ESN) including the physical address of the digital output.

Note: Refer to Annex B regarding digital output location.

Present: Displays the current status of the digital output, whether the output is on-line or off-line.
No = Unit is off-line
Yes = Unit is on-line & available

Extra: Displays the current status of the digital output, whether the output is available, or has not yet been captured.
No = Unit has been captured
Yes = Unit has not been captured

Mapped: Displays the current mapping status of the digital output.
No = Digital output has not been mapped
Yes = Digital output has been mapped

Ignore Unused I/O’s: Once selected, hides all the digital inputs that are not mapped.

State: Displays the status of the digital output as confirmed by the remote unit.
On = Output is confirmed “active” by the Remote
Off = Output is confirmed “idle” by the Remote

Information: Displays the operational command and status of the digital output.

Change to 1: An “ON” command has been sent to Remote

Change to 0: An “OFF” command has been sent to Remote

Override: Output manually activated.

Faulty O/C: Output has sensed no current draw IE: there is no solenoid or relay attached and circuit is open

Faulty S/C: Output has sensed excessive current draw and determined that the output circuit is shorted.

Step 7 Select Advanced Mode

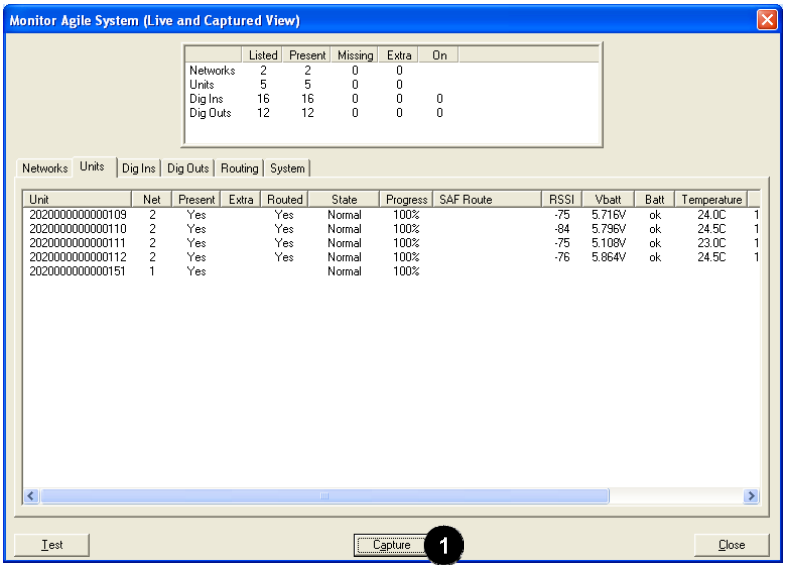
Note: Refer to setting advanced mode user guide in section 5.5

Step 6 Capture

Once all the Remote units and their digital inputs and digital outputs are confirmed on-line, the system is ready to be captured.
Once the system is captured, the captured data is used as a system reference. Any changes to the status of the actual system compared with the reference data will be displayed in the monitor mode of the Host unit.

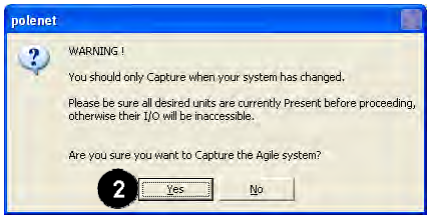
The Captured data is also made available for I/O mapping for the master controller.

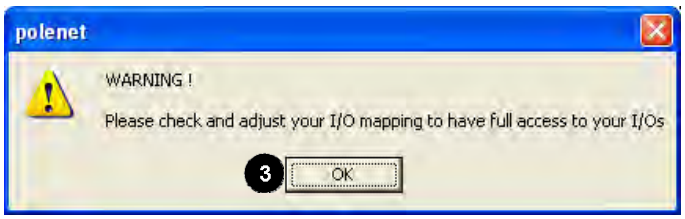
6.1 Select the “Capture” button


Monitor Agile System (Live and Captured View)
Listed Present Missing Extra On
Networks 2 2 0 0
Units 5 5 0 0
Dig Ins 16 16 0 0 0
Dig Outs 12 12 0 0 0
Networks Units Dig Ins Dig Outs Routing System
Unit Net Present Extra Routed State Progress SAF Route RSSI Vbatt Batt Temperature
2020000000000109 2 Yes Yes Normal 100% -75 5.716V ok 24.0C 1
2020000000000110 2 Yes Yes Normal 100% -84 5.796V ok 24.5C 1
2020000000000111 2 Yes Yes Normal 100% -75 5.108V ok 23.0C 1
2020000000000112 2 Yes Yes Normal 100% -76 5.864V ok 24.5C 1
2020000000000151 1 Yes Normal 100%
Test
Capture
1
Close

6.2 Select the “Yes” button to confirm the capture process

6.3 Select the “OK” button to confirm the warning message


polenet
WARNING !
You should only Capture when your system has changed.
Please be sure all desired units are currently Present before proceeding, otherwise their I/O will be inaccessible.
Are you sure you want to Capture the Agile system?
2
Yes
No



Note: Once the system is captured the data displayed in the “Extra” column will disappear.

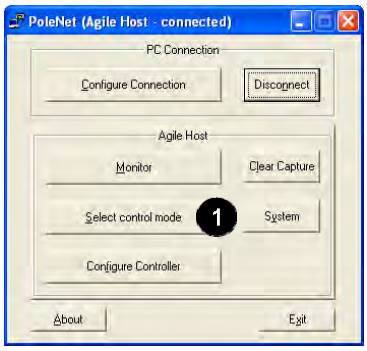
6. Configurations – Host Controllers

6.1. Configuration - For NMC-Pro

Prior to performing configuration settings for the NMC-Pro, confirm that you have performed a successful capture from the Host unit.

Step 1 Connect communication cable between PC and Host unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.2)

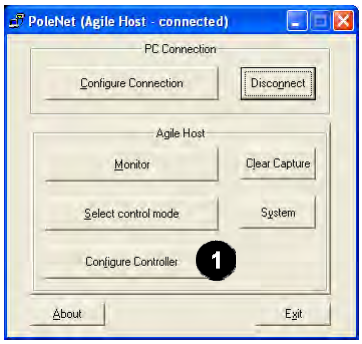
Step 2 Access Agile Host – Select control mode
2.1 Select “Select control mode” button



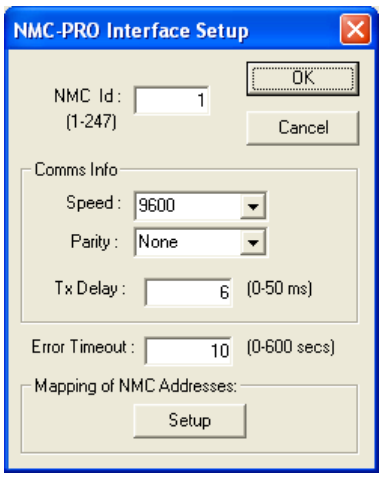
Step 3 Select control mode “NMC PRO” for correct Host unit operation

3.1 Select the “NMC-Pro” from the selection list
3.2 Select the “Okay” button to confirm selection

Step 4 Select “Configure Controller” button

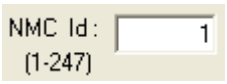


Step 5 Define the configuration settings to suit your local requirements



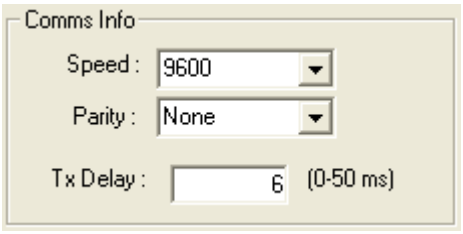
6.1.1. Setup Agile Host Unit – Configure Controller Definitions

NMC Id:



The Host unit needs a unique identification number, we recommend you use the default 1 for communicating to the Host unit via RS232. This value is only important if there are multiple devices connected to the NMC-PRO on a serial RS-485 network.

Comms Info:



Speed: Select the baud rate setting to the same setting as defined in the NMC-PRO (Menu 6.2). Default settings is 9600, or optional 19200.

Parity: Default setting = None

Tx Delay: Default setting = 6 ms

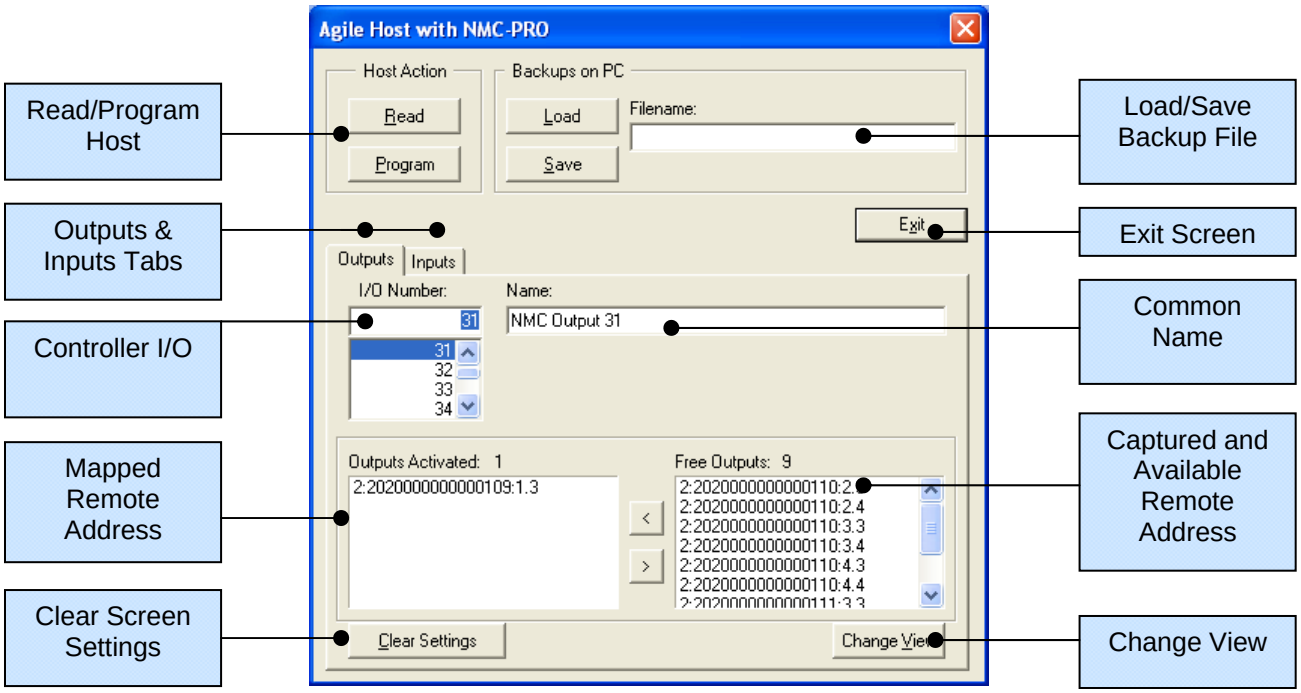
The Tx Delay is provided to cater for the NMC-Pro controller and other devices which may hold onto the RS-485 lines after sending commands, or which may take some time to be ready for a response. The Host unit will wait for the Tx Delay time before responding to NMC-Pro commands.

Error Timeout:

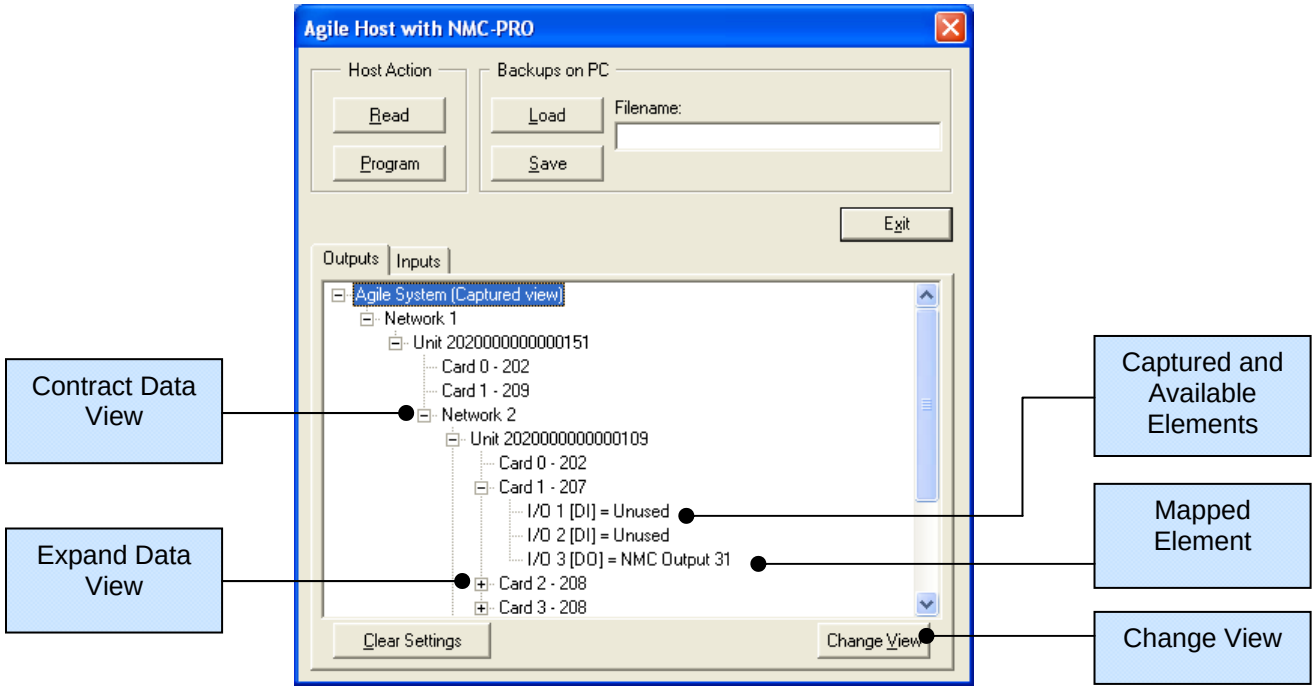
The Error Timeout interval determines when there is a communication failure between the Host unit and NMC-Pro controller. If there is no successful communication, longer than the period defined, the Host unit considers that the NMC-Pro is off-line and the Host unit will send a command to all active outputs to close.

Step 6 Enter the I/O mapping screen
6.1 Select “Setup” button

Step 7 Mapping of NMC address to Remote address
7.1 Complete RadioNet Host to NMC-Pro Mapping Form (Example located in Annex D)
7.2 Complete mapping data
7.3 Save a backup copy
7.4 Program Host



"Changed View"



6.1.2. Mapping of NMC Address Settings Definitions

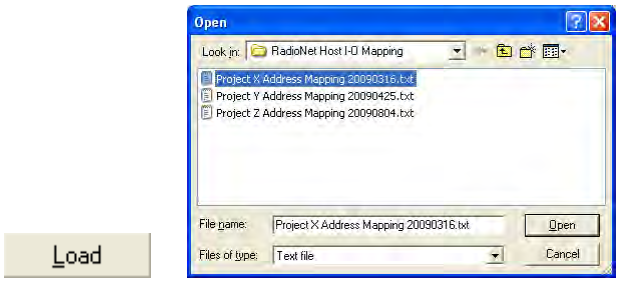
Read:

Selecting the “Read” button with upload the mapping information currently stored in the Host unit.

Program:

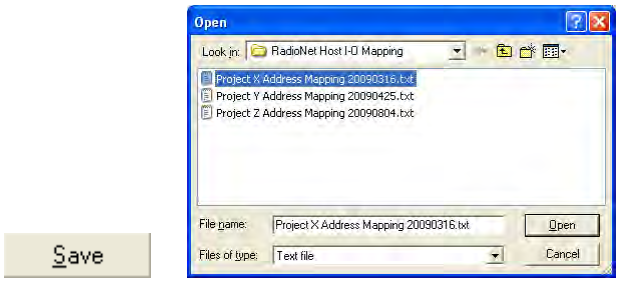
Selecting the “Program” button with download the current mapping information and store it into the Host unit’s memory. You will receive a warning pop-up at the completion of a successful download.

Load:



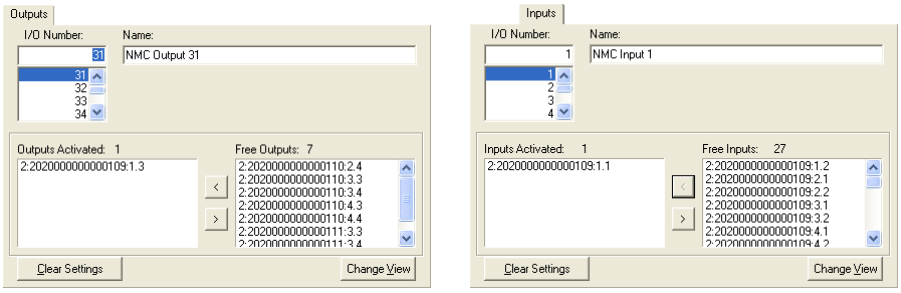
Selecting the “Load” button open a browse window which will enable you the locate a previously saved NMC Address settings

Save:



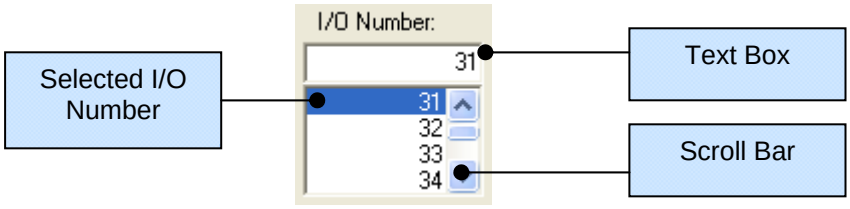
Selecting the “Save” button open a browse window which will enable you to locate a suitable location where you can save a backup copy of your NMC Address settings.

I/O Tabs:



Selecting the I/O Tabs toggles the settings screen between the Outputs view and the Inputs view.

I/O Number:

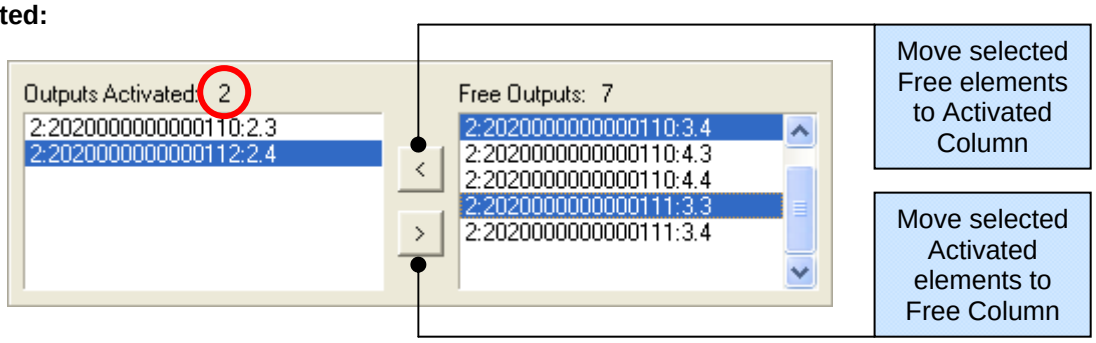


Selection can be made by using the scroll bar and highlighting the required I/O number of the NMC-Pro (identified by blue marker) or typing in required I/O number into text box and then selecting the I/O number of the NMC-Pro.

Name:

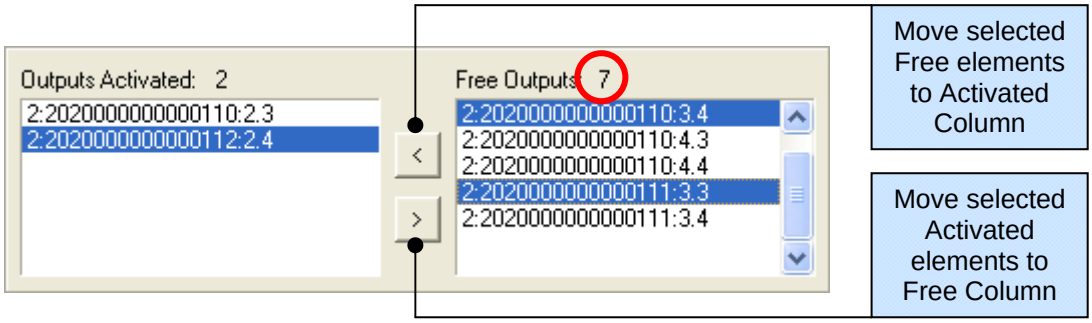
This is a read only screen which displays the current address of the NMC I/O.

Outputs/Inputs Activated:


Outputs Activated: 2
Free Outputs: 7
Move selected Free elements to Activated Column
Move selected Activated elements to Free Column

The “Activated” column displays the list of current remote I/O Address’s that have been assigned to the NMC-Pro I/O address. The number adjacent to the column heading (circled in red above) displays the total number of outputs assigned to the activated column.
Selection is made by highlighting the required remote element from the Free Column and then selecting the move left button to move the selection to the activated column. The reverse process can also be made when the other move right button is selected.

Free Outputs/Inputs:

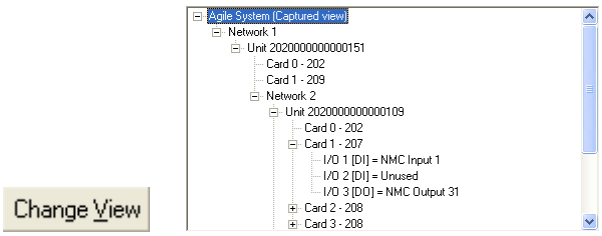


The “Free” column displays the list of captured remote I/O Address’s that are available to be mapped to the NMC-Pro I/O address. The number adjacent to the column heading (circled in red above) displays the total number of outputs that have not yet been mapped to the NMC-Pro Address.
Selection is made by highlighting the required remote element from the Free Column and then selecting the move left button to move the selection to the activated column. The reverse process can also be made when the other move right button is selected.

Clear Settings:

Selecting the Clear Settings button will clear all mapped data in the Host unit. You will see that **all** the elements in the “Activated” column will return to the “Free” Column.

Change View:



Selecting the “Change View” button will display both the input and output mapping data as viewed from the Remote units hardware point of view.

6.2. Explanation – Host Unit Expansion Cards

The RadioNet system has been design to be incorporated into existing irrigation controllers that don't have the features of wireless control and monitoring. We call the Parallel Controller Mode. To use this mode, there are 2 optional expansion cards that maybe inserted inside the Host Unit.

- 48 x Parallel Input Card
- 48 x Output Card (for input status playback)

The Input Card has been designed to except the wet voltage supplied from the Parallel Controller's outputs and transfer this information to a remote RadioNet RTU. Refer to Fig. 6.2a below.

The Output Card has been designed to playback the remote input status back into the Parallel Controllers input circuit. Refer to Fig. 6.2c below

Both cards maybe installed inside the Host Unit to offer both input and output features at the same time. Refer to fig. 6.2b below

Fig. 6.2a

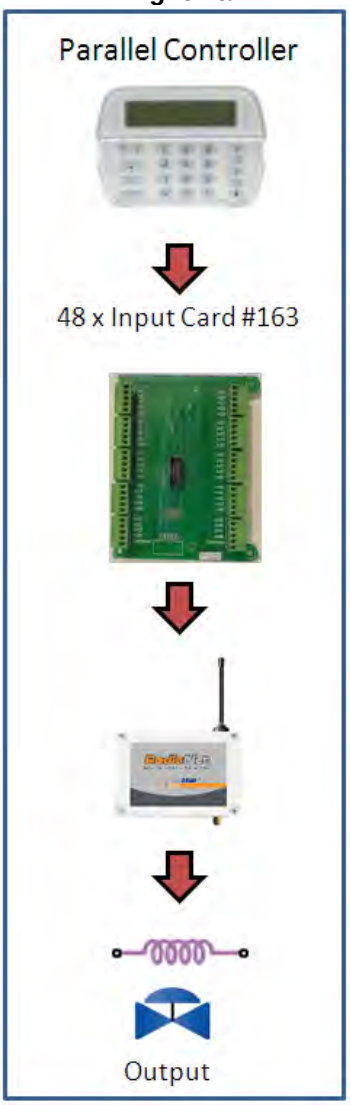


Fig. 6.2b

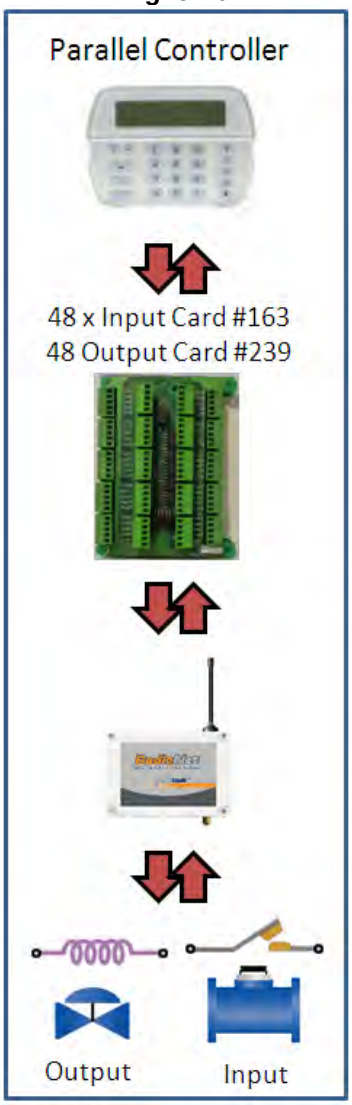
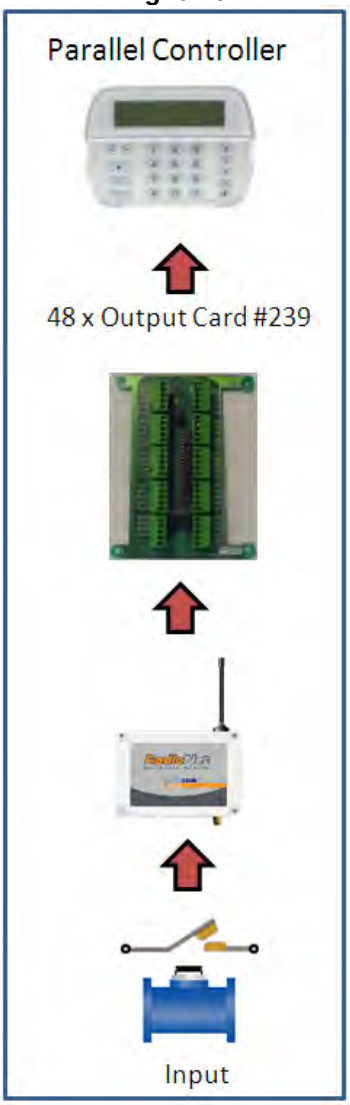


Fig. 6.2c



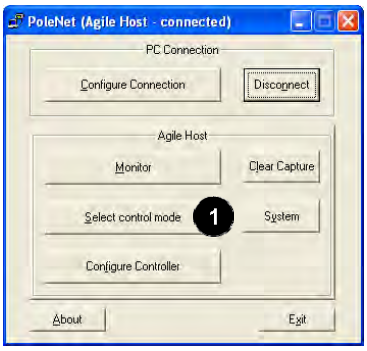
6.3. Configuration – Host Unit Expansion Card, 48 Parallel Inputs

Prior to performing configuration settings for the Parallel Controller, confirm that you have performed a successful capture from the Host unit.

Note: This feature requires the 48 Parallel Input card to be inserted inside the Host Unit. (Part # 00035-008330) (Board # 163)

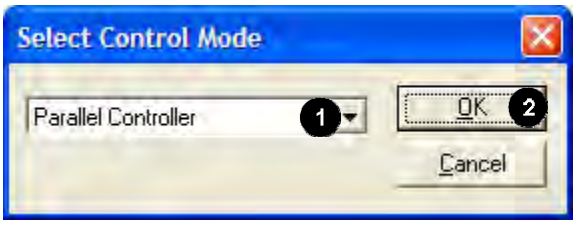
Step 1 Connect communication cable between PC and Host unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.2)

Step 2 Access Agile Host – Select control mode
2.1 Select “Select control mode” button

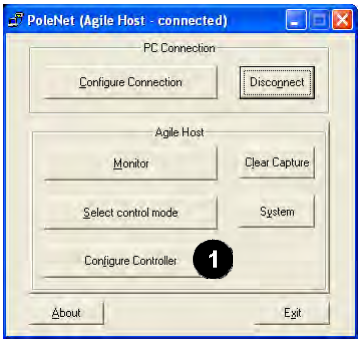


Step 3 Select control mode “Parallel Controller” for correct Host unit operation

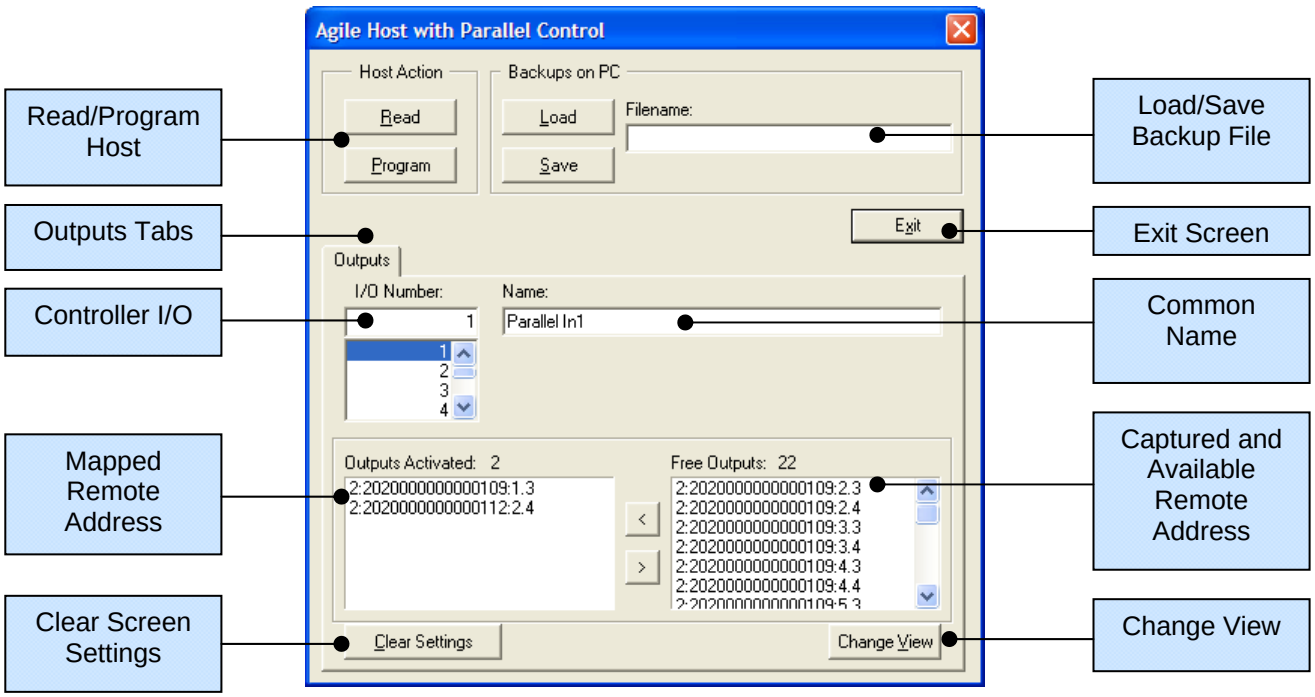
3.1 Select the “Parallel Controller” from the selection list
3.2 Select the “Okay” button to confirm selection



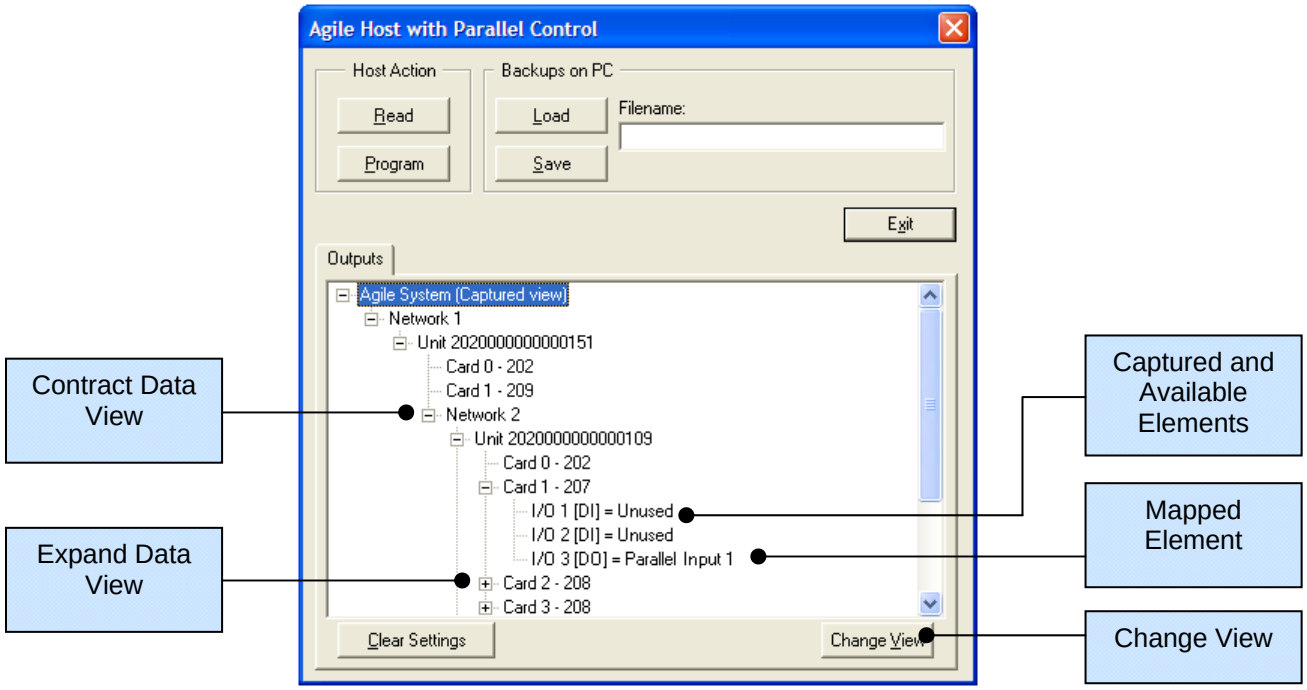
Step 4 Select “Configure Controller” button



Step 5 Mapping of Parallel Controller address to Remote address
5.1 Complete RadioNet Host to Parallel Controller Mapping Form (Example located in Annex D)
5.2 Complete mapping data
5.3 Save a backup copy
5.4 Program Host



"Changed View"



6.3.1. Mapping of Parallel Controller Input Address Settings Definitions

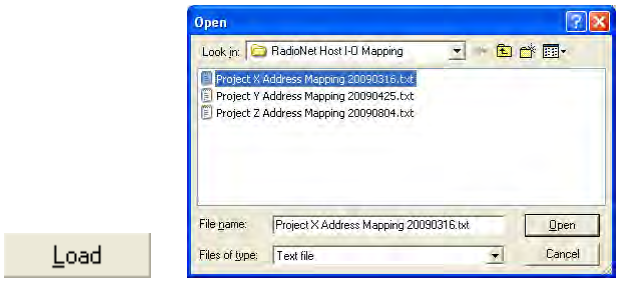
Read:

Selecting the “Read” button with upload the mapping information currently stored in the Host unit.

Program:

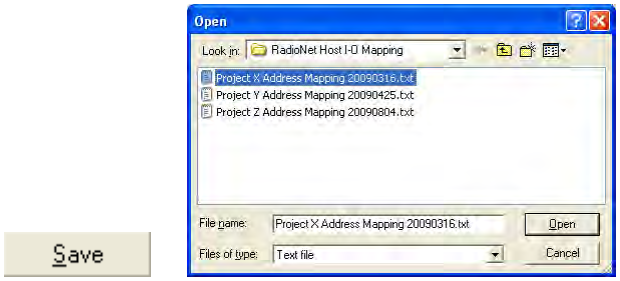
Selecting the “Program” button with download the current mapping information and store it into the Host unit’s memory. You will receive a warning pop-up at the completion of a successful download.

Load:



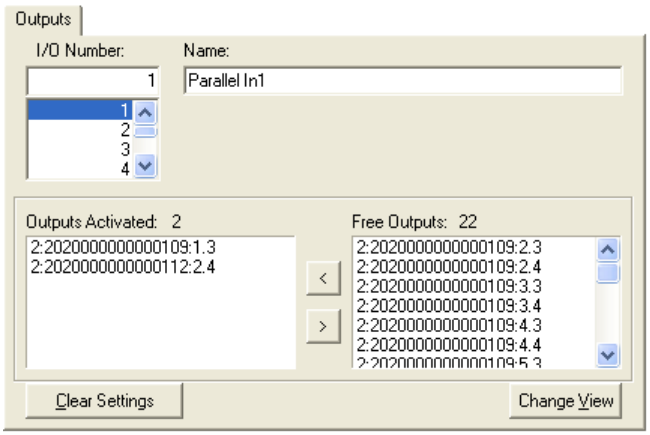
Selecting the “Load” button open a browse window which will enable you the locate a previously saved Parallel Controller Address settings

Save:



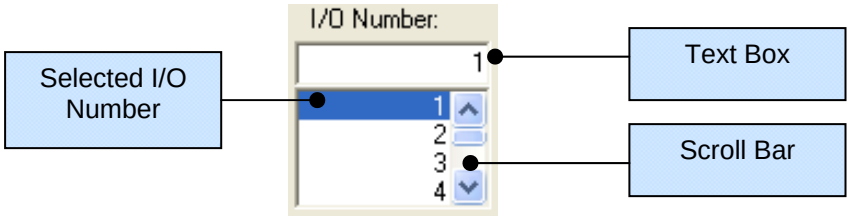
Selecting the “Save” button open a browse window which will enable you to locate a suitable location where you can save a backup copy of your Parallel Controller Address settings.

Outputs Tabs:



Selecting the Outputs Tabs displays the settings screen for the Outputs view.

I/O Number:

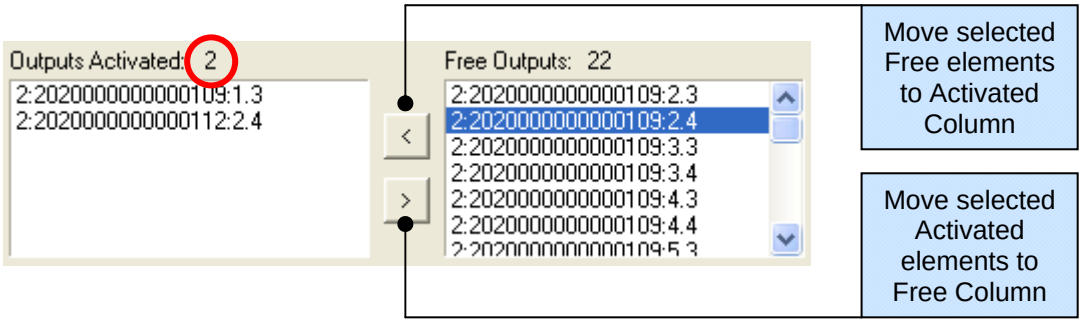


Selection can be made by using the scroll bar and highlighting the required I/O number of the Parallel Controller (identified by blue marker) or typing in required I/O number into text box and then selecting the I/O number of the Parallel Controller.

Name:

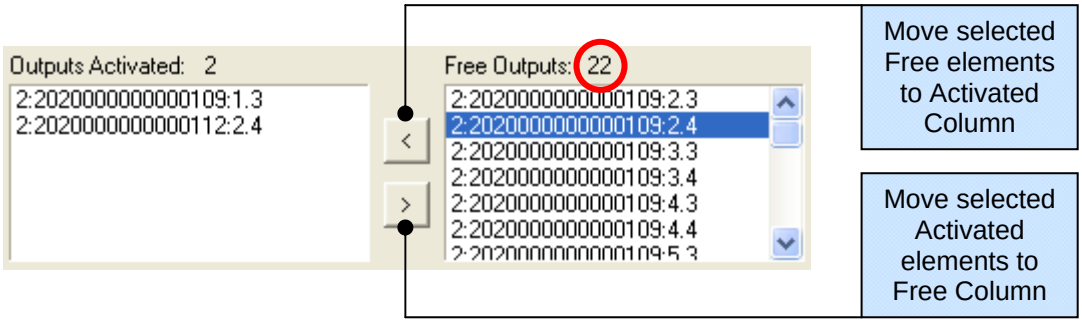
This is a read only screen which displays the current address of the Parallel Controller I/O.

Outputs Activated:



The “Activated” column displays the list of current remote I/O Address’s that have been assigned to the Parallel Controller I/O address. The number adjacent to the column heading (circled in red above) displays the total number of outputs assigned to the activated column.
Selection is made by highlighting the required remote element from the Free Column and then selecting the move left button to move the selection to the activated column. The reverse process can also be made when the other move right button is selected.

Free Outputs:

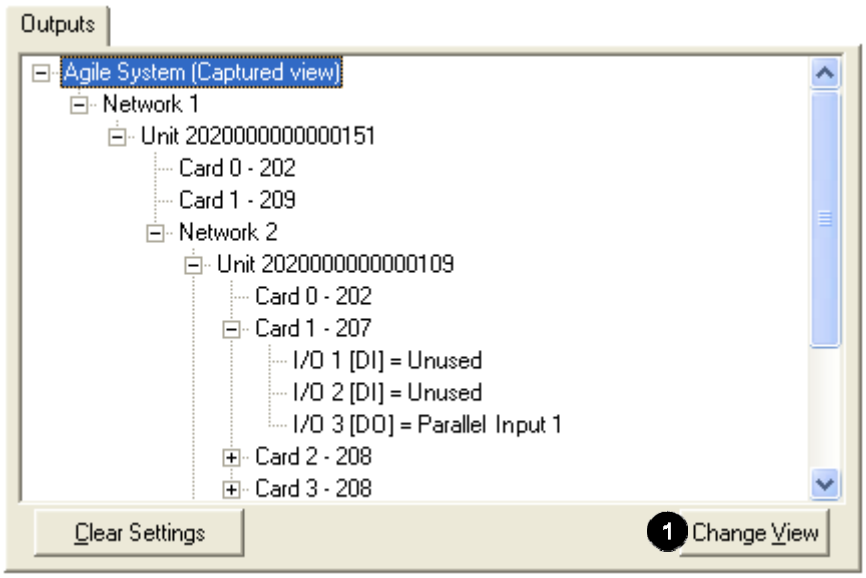


The “Free” column displays the list of captured remote I/O Address’s that are available to be mapped to the Parallel Controller I/O address. The number adjacent to the column heading (circled in red above) displays the total number of outputs that have not yet been mapped to the Parallel Controller Address.
Selection is made by highlighting the required remote element from the Free Column and then selecting the move left button to move the selection to the activated column. The reverse process can also be made when the other move right button is selected.

Clear Settings:

Selecting the Clear Settings button will clear all mapped data in the Host unit. You will see that **all** the elements in the “Activated” column will return to the “Free” Column.

Change View:



Selecting the “Change View” button will display both the input and output mapping data as viewed from the Remote units hardware point of view.

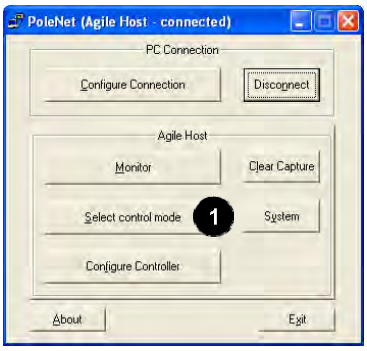
6.4. Configuration – Host Unit Expansion Card, 48 Output (Input Playback)

Prior to performing configuration settings for the Parallel Controller, confirm that you have performed a successful capture from the Host unit.

Note: This feature requires the 48 Parallel Input card to be inserted inside the Host Unit. (Part # 00035-008340) (Board # 239)

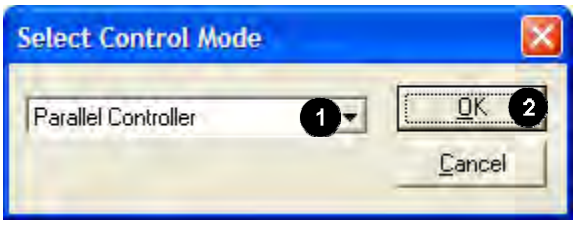
Step 1 Connect communication cable between PC and Host unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.2)

Step 2 Access Agile Host – Select control mode
2.1 Select “Select control mode” button

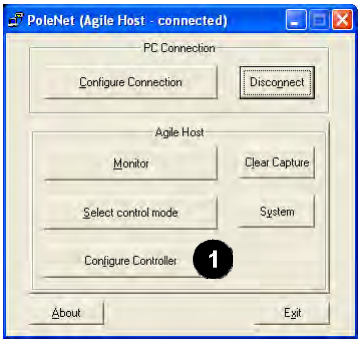


Step 3 Select control mode “Parallel Controller” for correct Host unit operation

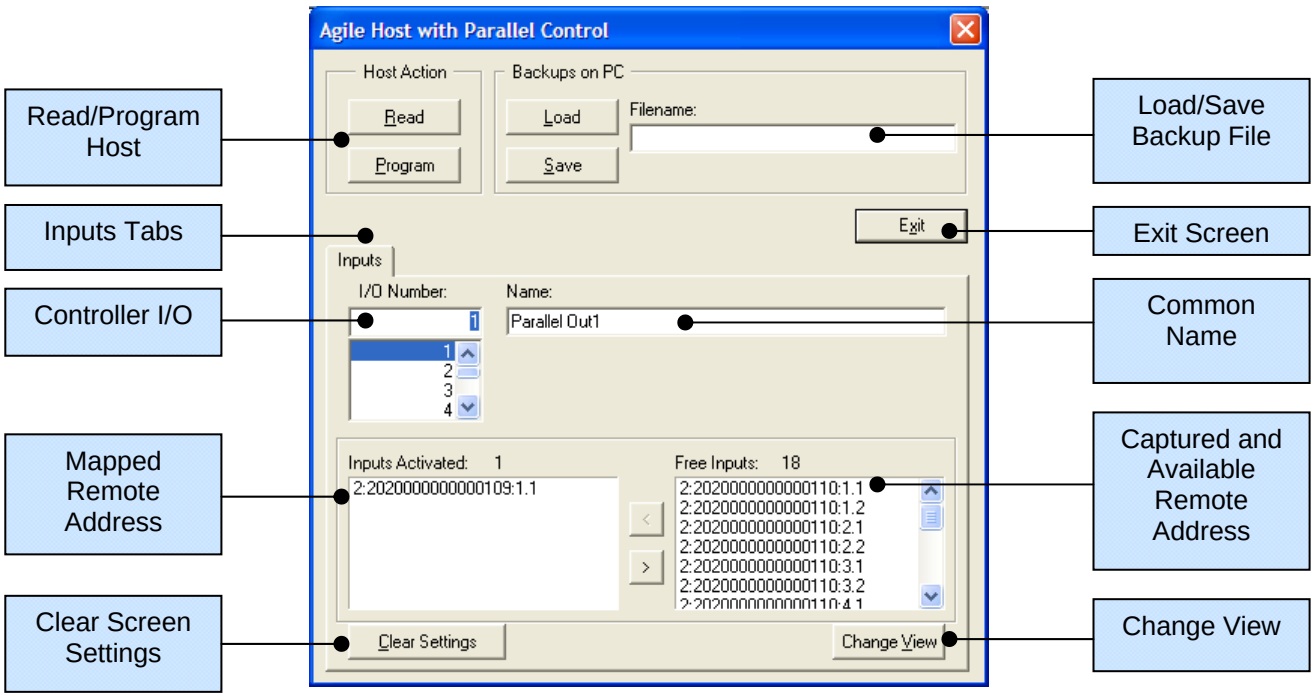
3.1 Select the “Parallel Controller” from the selection list
3.2 Select the “Okay” button to confirm selection



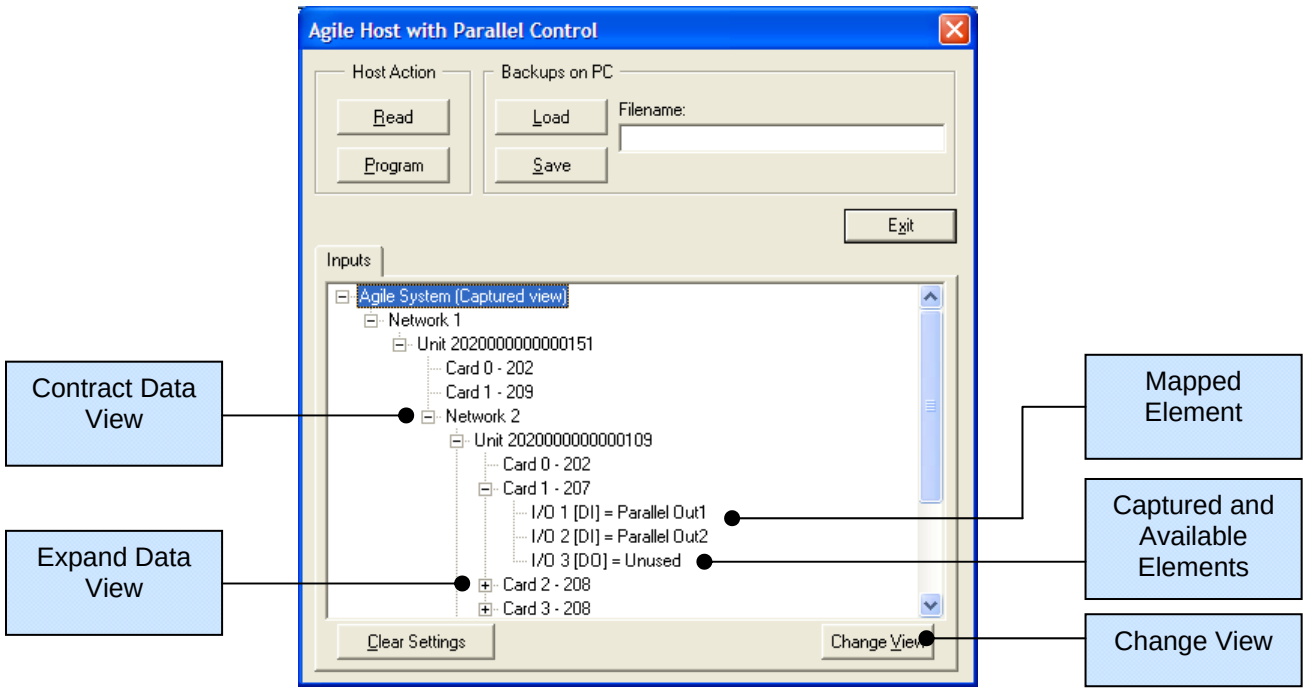
Step 4 Select “Configure Controller” button



Step 5 Mapping of Parallel Controller address to Remote address
5.1 Complete RadioNet Host to Parallel Controller Mapping Form (Example located in Annex D)
5.2 Complete mapping data
5.3 Save a backup copy
5.4 Program Host



"Changed View"



6.4.1. Mapping of Parallel Controller Output Address Settings Definitions

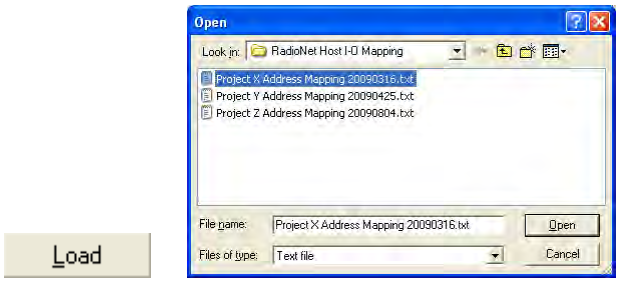
Read:

Selecting the “Read” button with upload the mapping information currently stored in the Host unit.

Program:

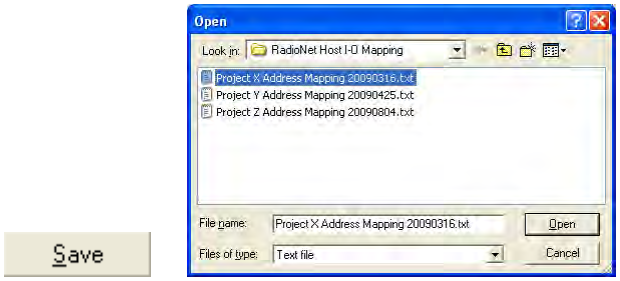
Selecting the “Program” button with download the current mapping information and store it into the Host unit’s memory. You will receive a warning pop-up at the completion of a successful download.

Load:



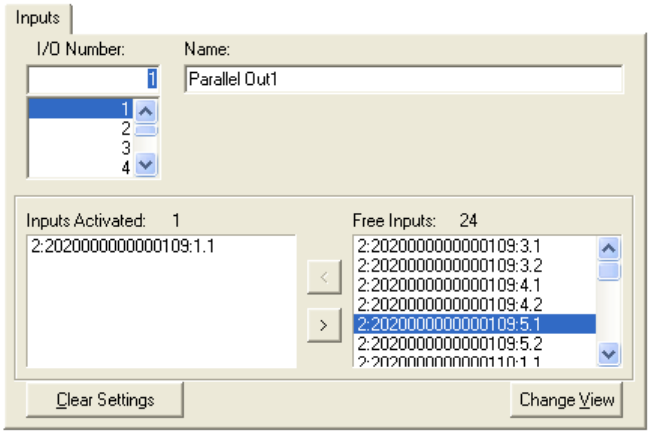
Selecting the “Load” button open a browse window which will enable you the locate a previously saved Parallel Controller Address settings

Save:



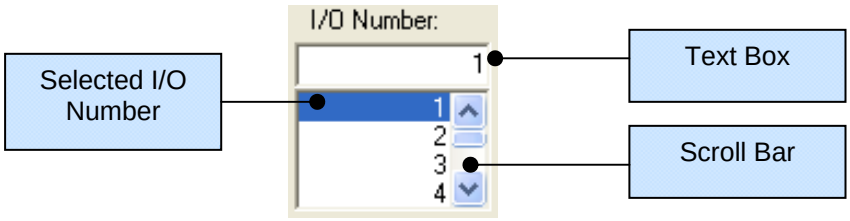
Selecting the “Save” button open a browse window which will enable you to locate a suitable location where you can save a backup copy of your Parallel Controller Address settings.

Inputs Tabs:



Selecting the Inputs Tabs displays the settings screen for the Inputs view.

I/O Number:

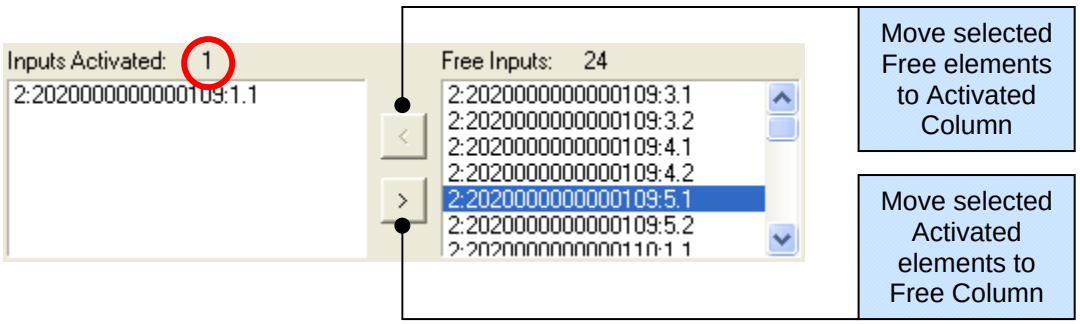


Selection can be made by using the scroll bar and highlighting the required I/O number of the Parallel Controller (identified by blue marker) or typing in required I/O number into text box and then selecting the I/O number of the Parallel Controller.

Name:

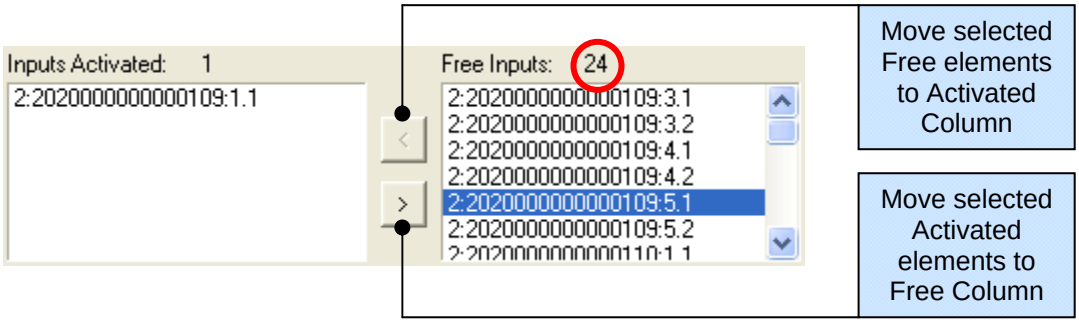
This is a read only screen which displays the current address of the Parallel Controller I/O.

Inputs Activated:



The “Activated” column displays the list of current remote I/O Address’s that have been assigned to the Parallel Controller I/O address. The number adjacent to the column heading (circled in red above) displays the total number of outputs assigned to the activated column.
Selection is made by highlighting the required remote element from the Free Column and then selecting the move left button to move the selection to the activated column. The reverse process can also be made when the other move right button is selected.

Free Inputs:

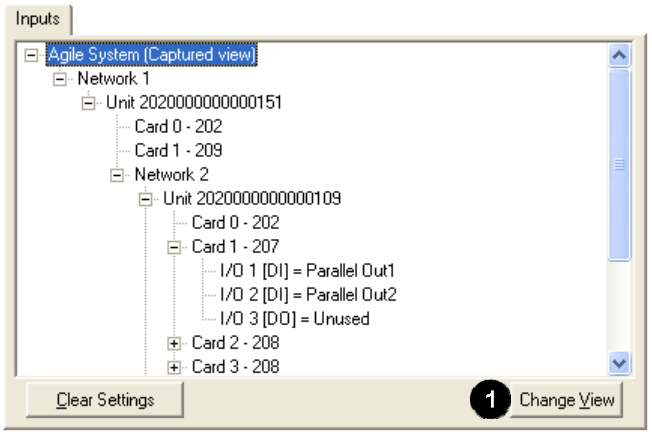


The “Free” column displays the list of captured remote I/O Address’s that are available to be mapped to the Parallel Controller I/O address. The number adjacent to the column heading (circled in red above) displays the total number of inputs that have not yet been mapped to the Parallel Controller Address.
Selection is made by highlighting the required remote element from the Free Column and then selecting the move left button to move the selection to the activated column. The reverse process can also be made when the other move right button is selected.

Clear Settings:

Selecting the Clear Settings button will clear all mapped data in the Host unit. You will see that **all** the elements in the “Activated” column will return to the “Free” Column.

Change View:



Selecting the “Change View” button will display both the input and output mapping data as viewed from the Remote units hardware point of view.

7. Diagnostics & Trouble Shooting Guide

We realize that when you working with wireless control, you are working with a medium that is invisible, difficult to understand at the best of times and there are no simple tools that you can use such as a pressure gauge or multi-meter. Netafim developed the RadioNet and PoleNet PC software with this in mind.

The PoleNet PC software provides you will the necessary tools to test and diagnose a wide range of faults that you are most likely to come across whilst dealing with wireless communications.

7.4. Diagnostics – Host

7.4.1. Host Diagnostics – Hardware

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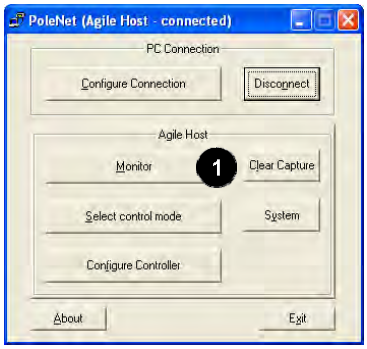
7.4.2. Host Unit Diagnostics – Software

Step 1 Connect communication cable between PC and Host unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.2)

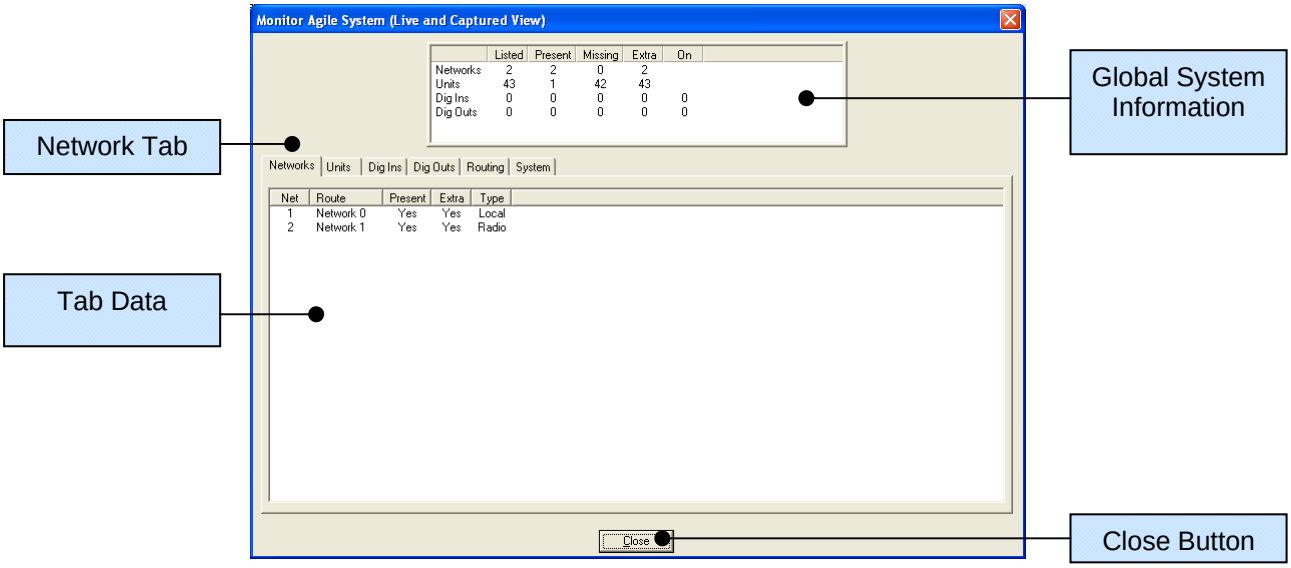
Step 2 Access Agile Host – Monitor
2.1 Select Monitor button



7.4.2.1. Host Unit Diagnostics - Networks

The monitor window provides an overview of the complete RadioNet system as viewed from the Host unit and Base unit. Prior to configuring the Host unit, we need to make sure that the route map data that has been entered into the base is also viewed correctly via the Host unit.

The screen is divided into 2 main sections.
The top portion of the display is Global System Information as viewed from the Host unit and Base unit, while the bottom portion displays information relating to tab selected, in this example the Tab Data displays the available networks.

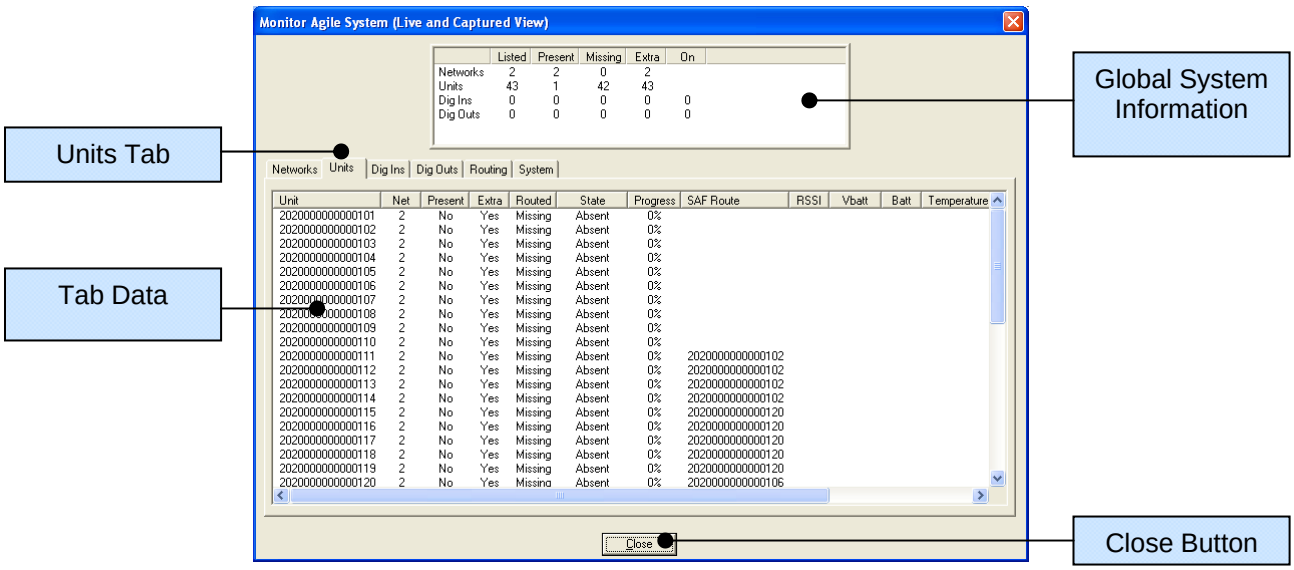

Monitor Agile System (Live and Captured View)
Listed Present Missing Extra On
Networks 2 2 0 2
Units 43 1 42 43
Dig Ins 0 0 0 0 0
Dig Outs 0 0 0 0 0
Networks Units Dig Ins Dig Outs Routing System
Net Route Present Extra Type
1 Network 0 Yes Yes Local
2 Network 1 Yes Yes Radio
Close
Network Tab
Tab Data
Global System Information
Close Button

7.4.2.2. Definitions of Host Monitor Mode – Networks Tab

Listed:	Displays the total number of devices (networks, units, I/O) that is theoretically available to both the Host unit and the Base unit. **Note:** The Base Radio is included as both a network and as a unit. **Note:** The quantity of units is derived from the base plus the numbers of units defined in the route map.
Present:	Displays the total number of active devices (networks, units, I/O) that are currently connected to the Host unit and the Base unit, either physically or via the wireless network.
Missing:	Displays the total number of devices (networks, units, I/O) that the Host unit or Base unit has not currently made a connection with.
Extra:	Displays the total number of devices (networks, units, I/O) as defined in the Host unit and Base unit that has not been captured.
On:	Displays the total number of digital inputs and digital outputs that are currently ON within the system
Network Tab:	Displays the status of the networks that are accessible
Units Tab:	Displays the status of the defined units, both Base units and Remotes units that are accessible
Routing Tab:	Displays both the network configuration and routing configuration as seen by both the Host unit and Base unit.

7.4.2.3. Host Unit Diagnostics - Base & Remote Units

The monitor window provides a status overview of the Base unit and Remote units as viewed from the Host unit and Base unit. Status information includes network, mapping, routing, signal strength, battery voltage, battery condition, unit temperature and firmware version.

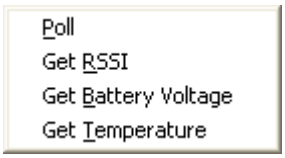


7.4.2.4. Definitions of Host Monitor Mode – Units Tab

Unit:	Displays the Electronic Serial Number (ESN) of all the units that have been configured in the route map.
Net:	Displays which network the unit belongs too.
Present:	Displays the current status of the unit, whether the unit is on-line or off-line. **No** = Unit is off-line **Yes** = Unit is on-line & available
Extra:	Displays the current status of the unit, whether the unit is available, or has not yet been captured. **No** = Unit has been captured **Yes** = Unit has not been captured
Routed:	Displays the current status of the unit, whether the unit is on-line or off-line. When the unit is on-line, several conditions may exist. **Missing** = Unit is off-line **Yes** = Unit is on-line & available **Orphan** = Unit that has been adopted in the aloud list of the base (old route map), but not included in the new route map **Rogue** = Unit that has been adopted by the Host (old route map) and is not on the allowed list of the base. **Note:** If you see Orphan's or Rogue's, a Host reset should be performed.

State:	Displays the status of the unit. **Absent** = Unit is off-line **Get I/O Cal** = Unit is on-line & uploading I/O information **Set Mode** = Unit is on-line & comm. mode is being set **Normal** = Unit is on-line
Progress:	Displays the unit's progress as it is coming on-line. **0%** = Unit is off-line **100%** = Unit is on-line & available
SAF Route:	Displays the remotes unit's communication path via a Store and Forward (SAF) Repeater unit, which is also known as it's Master.
RSSI:	Displays the received signal strength from the view point of the remote unit. IE: the received signal strength from the remote unit's master.
Vbatt:	Displays the current battery voltage in the remote unit. **EG: 6.543V**
Batt:	Displays the remote unit's battery condition. **Ok** = Battery okay **Warn** = Battery warning, normal charge can't be maintained **Low** = Battery voltage getting low, urgent action required **Fail** = Battery voltage is very low, unit has turned off the digital outputs and radio and is now in hibernation.
Temperature:	Displays the current internal temperature of the radio board.
Time of Data:	Displays the time and data of the last status transmission generated from the remote unit.
FW:	Displays the unit's current firmware.
Drops:	Displays the number of communication drops **Note:** A drop is considered when the remote unit has not replied to the base within 8 communication cycle times. **Note:** Drops are only counted while the PoleNet is active.

Advanced Mode	Select the “Test” button to activate the diagnostic mode. Right mouse button selection on the required emote unit will activate a diagnostic pop-up window.

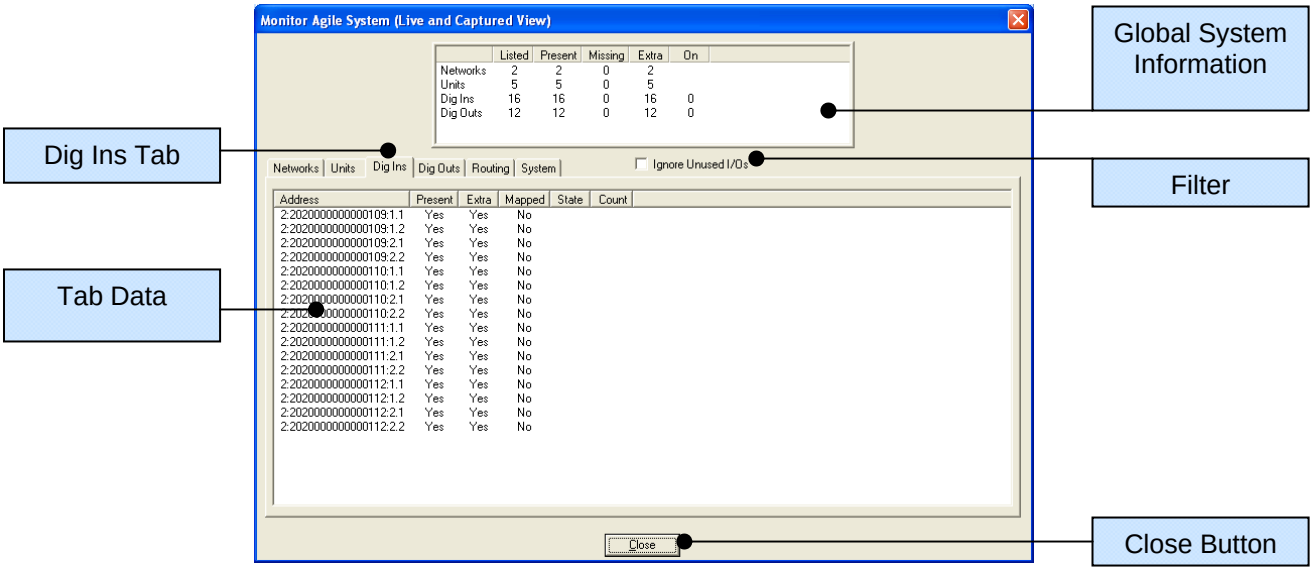


Note: Refer to setting advanced mode user guide in section 5.5

Poll:	A forced communication can be initiated with the remote unit within the next cycle time.
Get RSSI:	A forced communication, requesting the RSSI will be initiated with the remote unit within the next cycle time.
Get Battery Voltage:	A forced communication, requesting the current battery voltage will be initiated with the remote unit within the next cycle time.
Get Temperature:	A forced communication, requesting the current temperature will be initiated with the remote unit within the next cycle time.

7.4.2.5. Host Unit Diagnostics - Digital Inputs

The monitor window provides a status overview of all the digital inputs as viewed from the Host unit and Base unit. Status information includes whether the digital input is on-line or off-line, captured and mapped, current status and pulse count.

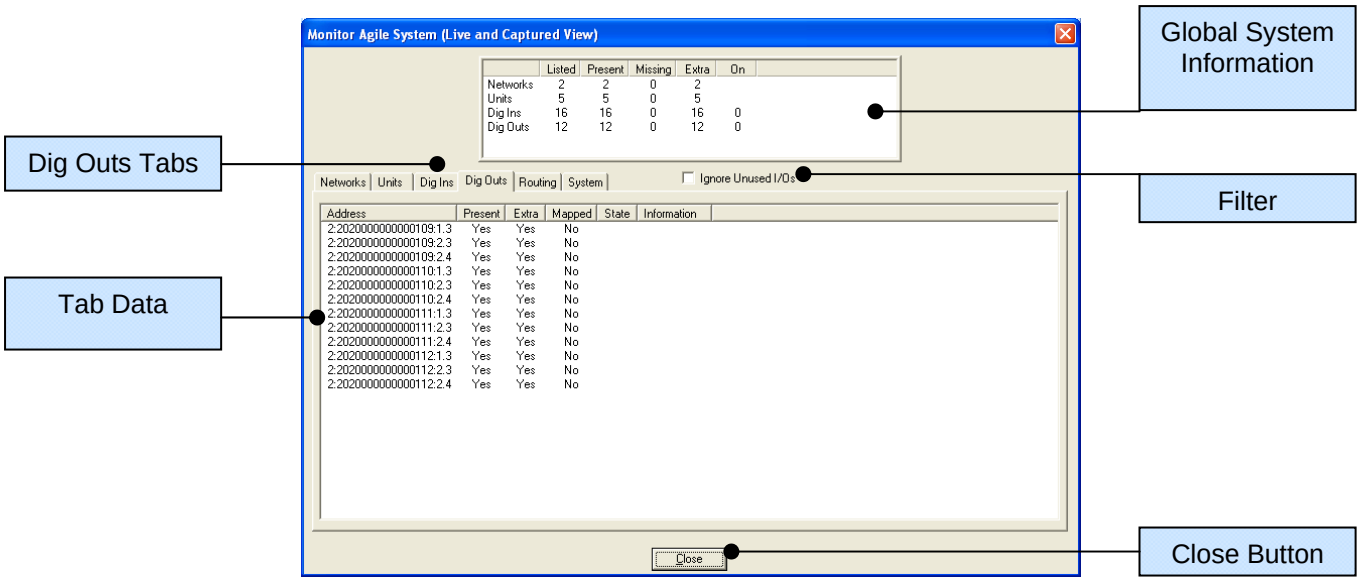


7.4.2.6. Definitions of Host Monitor Mode – Dig Ins Tab

Address:	Displays the network address followed by the units Electronic Serial Number (ESN) including the physical address of the digital input. **Note:** Refer to Annex B regarding digital output location.
Present:	Displays the current status of the digital input, whether the input is on-line or off-line. **No** = Digital Input is off-line **Yes** = Digital Input is on-line & available
Extra:	Displays the current status of the digital input, whether the input is available, or has not yet been captured. **No** = Digital Input has been captured **Yes** = Digital Input has not been captured
Mapped:	Displays the current mapping status of the digital output. **No** = Digital input has not been mapped **Yes** = Digital input has been mapped
State:	Displays the status of the digital input as confirmed by the remote unit. **1** = Input is confirmed “ON” by the Remote **No Data** = Input is confirmed “OFF” by the Remote
Count:	Displays the number of pulses counted by the remote **Note:** The pulse count is incremented on the trialing edge of the pulse IE: when the digital input turns off.

7.4.2.7. Host Diagnostics - Digital Outputs

The monitor window provides a status overview of all the digital outputs as viewed from the Host unit and Base unit. Status information includes whether the digital output is on-line or off-line, captured and mapped, current status and important information about digital output failures such as open and short circuit detection.



7.4.2.8. Definitions of Host Monitor Mode – Dig Outs Tab

Address: Displays the network address followed by the units Electronic Serial Number (ESN) including the physical address of the digital output.

Note: Refer to Annex B regarding digital output location.

Present: Displays the current status of the digital output, whether the output is on-line or off-line.

No = Unit is off-line
Yes = Unit is on-line & available

Extra: Displays the current status of the digital output, whether the output is available, or has not yet been captured.

No = Unit has been captured
Yes = Unit has not been captured

Mapped: Displays the current mapping status of the digital output.

No = Digital output has not been mapped
Yes = Digital output has been mapped

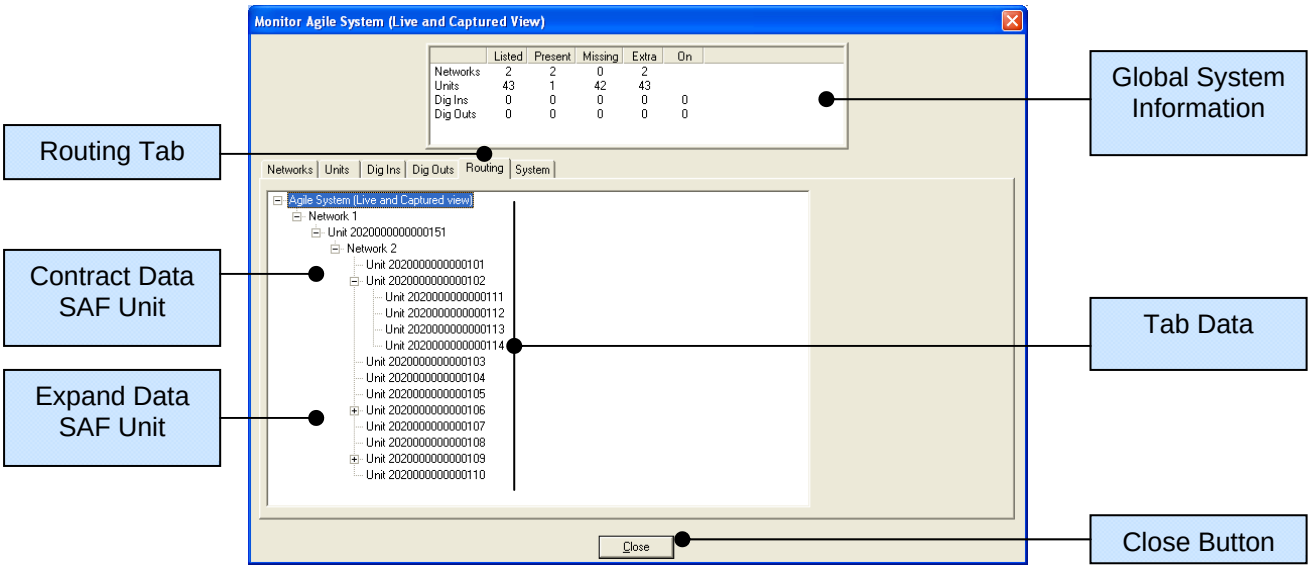
State:	Displays the status of the digital output as confirmed by the remote unit.		
	On	**=**	Output is confirmed “active” by the Remote
	Off	**=**	Output is confirmed “idle” by the Remote
Information:	Displays the operational command and status of the digital output.		
	Change to 1	**=**	An “ON” command has been sent to Remote
	Change to 0	**=**	An “OFF” command has been sent to Remote
	Override:	**=**	Output manually activated.
	Faulty O/C	**=**	Output has sensed no current draw IE: there is no solenoid or relay attached and circuit is open
	Faulty S/C	=	Output has sensed excessive current draw and determined that the output circuit is shorted.

7.4.2.9. Host Unit Diagnostics - Routing

The routing window provides an overview of the complete RadioNet system as viewed from the Host unit and Base unit.
This information is derived from the route map that has been programmed into the Base units memory.

The RadioNet Technician should confirm that the data displayed in the routing screen is identical to the site map which has been compiled earlier.

Note: Please confirm that the Host has been reset since the Route Map was downloaded into the Base.
Note: Please allow up to 45 seconds after Host unit resets.



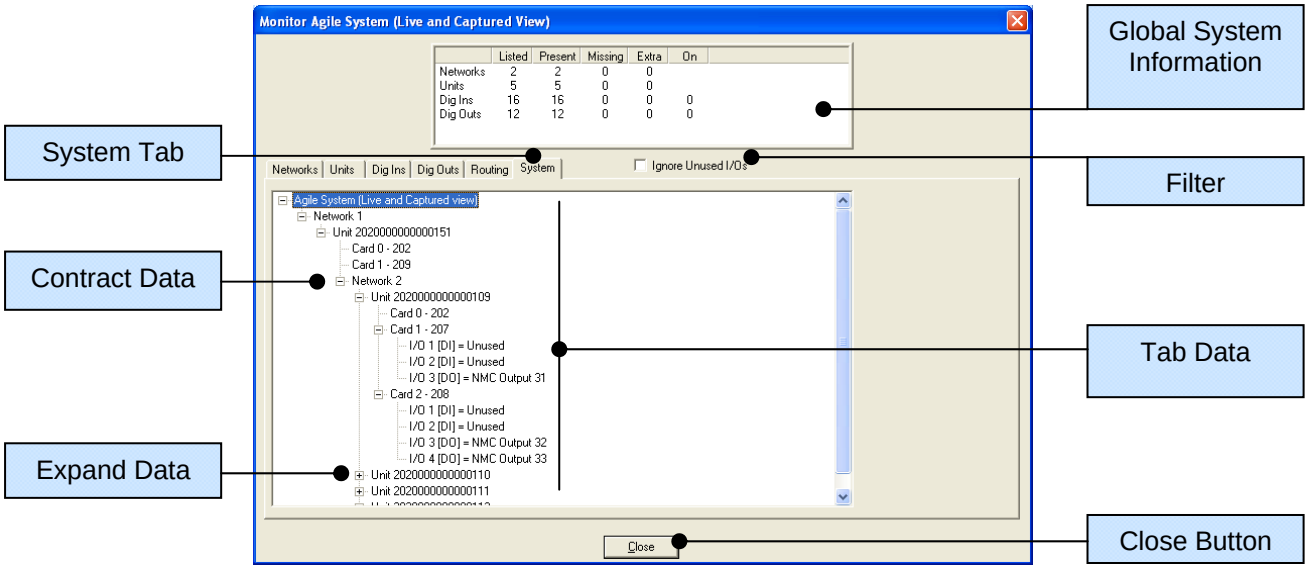
7.4.2.10. Host Unit Diagnostics - System

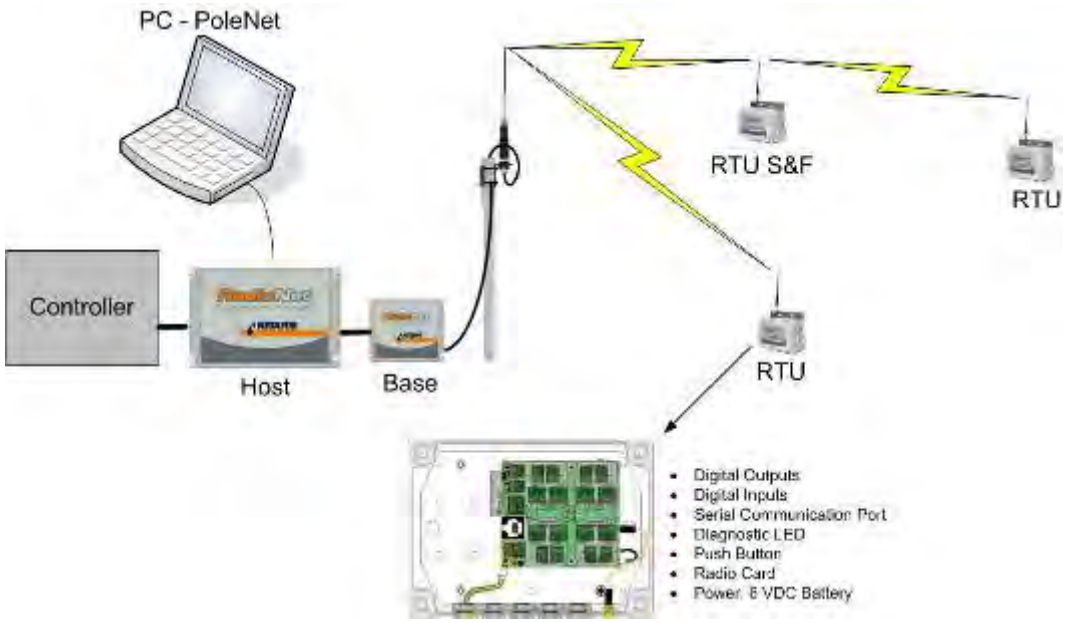
The system window provides an overview of the complete RadioNet system as viewed from the Host unit and Base unit.

This information is derived from the route map, captured data and I/O mapping.

Valuable information is displayed showing the connection from the mapped I/O through to network 1.

Note: Please confirm that the Host has been reset since the Route Map was downloaded into the Base.
Note: Please allow up to 45 seconds after Host unit resets.

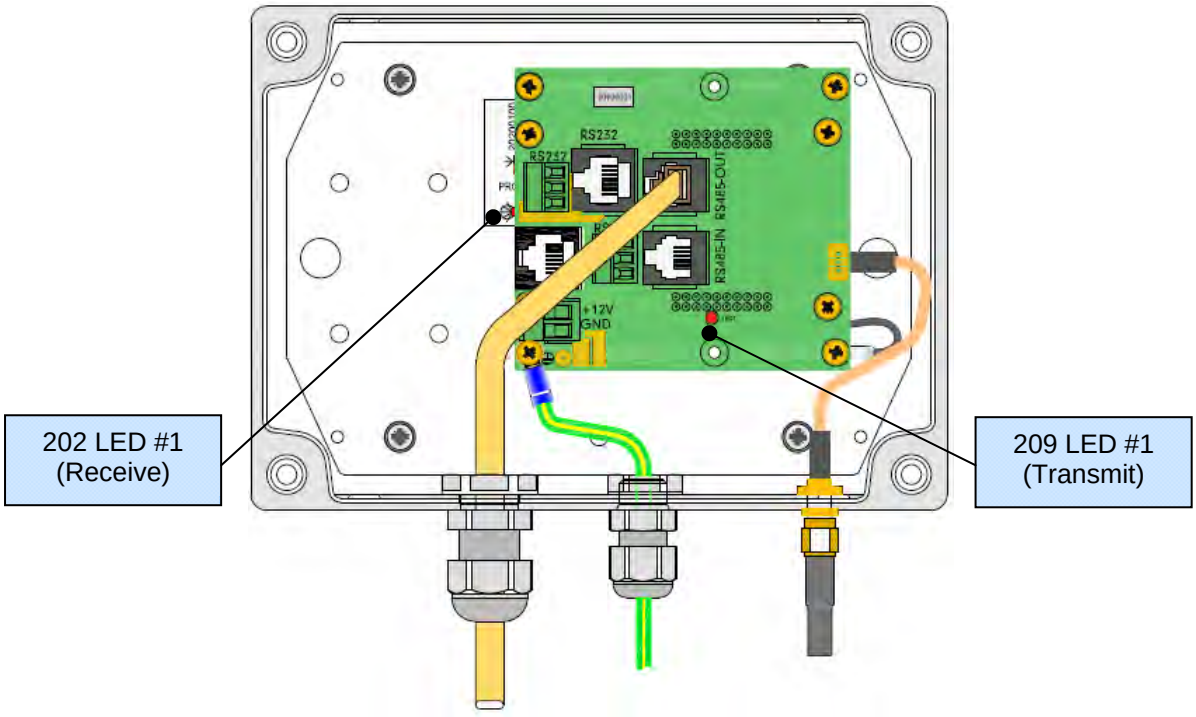

Monitor Agile System (Live and Captured View)
Listed Present Missing Extra On
Networks 2 2 0 0
Units 5 5 0 0
Dig Ins 16 16 0 0 0
Dig Outs 12 12 0 0 0
Networks Units Dig Ins Dig Outs Routing System
Ignore Unused I/Os
Agile System (Live and Captured view)
Network 1
Unit 2020000000000151
Card 0 - 202
Card 1 - 209
Network 2
Unit 2020000000000109
Card 0 - 202
Card 1 - 207
I/O 1 [DI] = Unused
I/O 2 [DI] = Unused
I/O 3 [DO] = NMC Output 31
Card 2 - 208
I/O 1 [DI] = Unused
I/O 2 [DI] = Unused
I/O 3 [DO] = NMC Output 32
I/O 4 [DO] = NMC Output 33
Unit 2020000000000110
Unit 2020000000000111
Close
System Tab
Contract Data
Expand Data
Global System Information
Filter
Tab Data
Close Button



7.5. Diagnostics – Base Unit

7.5.1. Base Unit Diagnostics – Hardware

Step 1 Identify location of the 2 diagnostic LEDs.



Step 2 Power up Base

Confirm that 202 LED #1 (Receive) flashes quickly (approximately 12 times)
The flashing LED acknowledges that the unit is powered up correctly and has passed its internal shelf checks.
209 LED #1 (Transmit) will illuminate every time the Base Radio has a requirement to transmit
202 LED #1 (Receive) will illuminate every time the Base Radio hears RadioNet data.

Note: 202 LED #1 is disabled when PC connection is made.

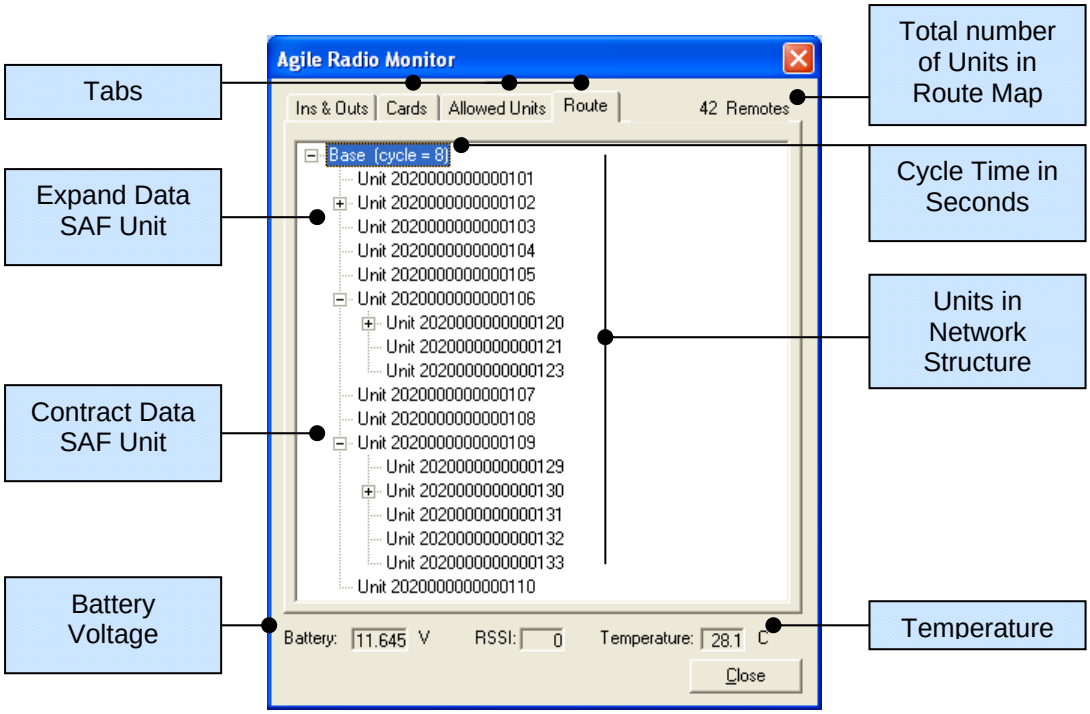
7.5.2. Base Unit Diagnostics – Software

PoleNet PC Software can be used to connect directly to the communication port of the Base unit. When selecting the monitor function, a range of functions are monitored, such as route map, allowed units, cards, battery voltage, and internal temperature of base radio.

Step 1 Connect communication cable between PC and base unit, start PoleNet PC software, configure connection and connect. (refer Chapter 4.3)

Step 2 Access RadioNet – Base Monitoring Mode
2.1 Select Monitor Button

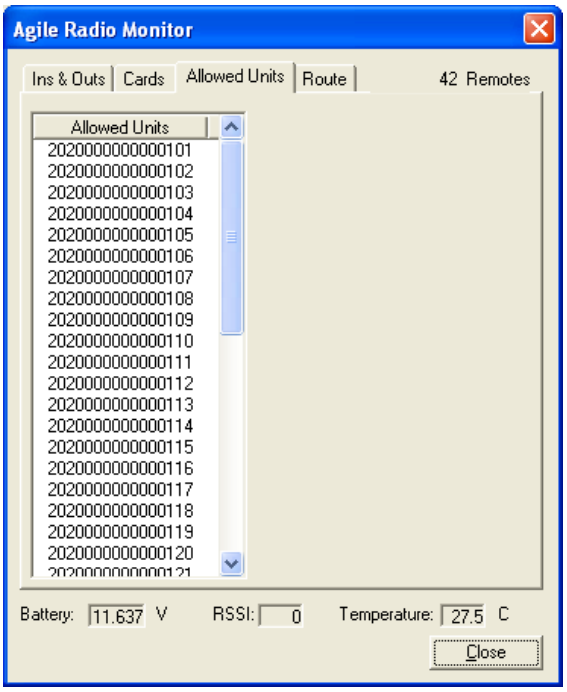
Step 4 Select “Route” Tab
The list displays the current number of digital inputs and digital outputs that correlates to the number and type of hardware that is connected and functional.



7.5.2.1. Definitions of Radio Base Monitor – Route Tab

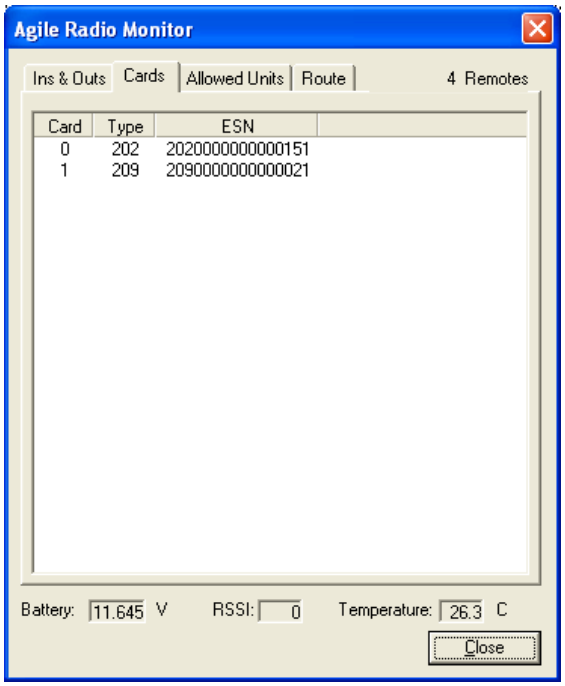
Route:	Displays the Route Map, including the network cycle time and the structure of the Network
Allowed Units:	Physical Address of the I/O available. This Address will be used for mapping of the RadioNet I/O to the Master Controllers I/O.
Cards:	Displays the current configuration of cards installed in the base unit
Ins & Outs:	Not used
# Remotes:	Displays the total number of remote units as defined in the route map.
Battery:	Displays the current configuration of cards installed in the base unit
RSSI:	Not used
Temperature:	Displays the current temperature of the internal base radio board
Close:	Exits the radio monitor screen

7.5.2.2. Definition of Radio Remote Monitor – Allowed Units Tab



Allowed Units:	The “Allowed Units” list allows the remote units to join this network. Should a remote unit with the same frequency be heard by the Base Radio, it will be ignored.

7.5.2.3. Definition of Radio Remote Monitor – Cards Tab



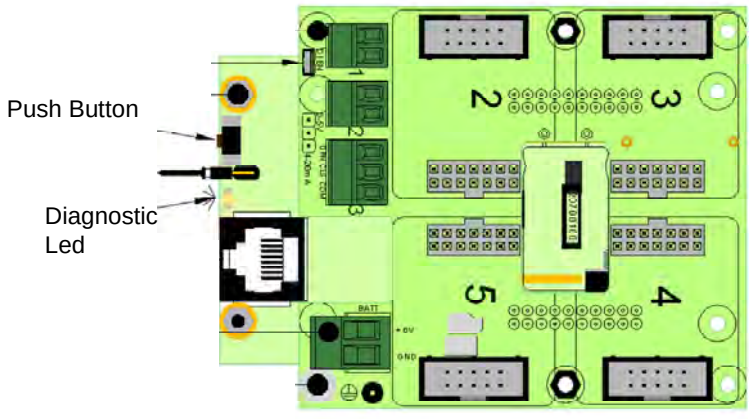
Card:	The card number represents the card position. **Note:** Refer to Annex B for card position number
Type:	The card type number represents that type of card which has been installed in this location. **Note:** Refer to Annex C for Card Type Number
ESN:	The Electronic Serial Number (ESN) of the card which has been installed in this location.

7.6. Diagnostics – Remote Unit

7.6.1. Remote Unit Diagnostics – Hardware

Step 1 Check wiring, confirm wiring of the power circuit prior to connection.

Step 2 Identify location of push button (PB) and diagnostic LED.



Note: Both the Push Button and the Diagnostic LED are located on the lower printed circuit board, adjacent to the RJ 45 Communication connector, located on the left hand side.

Step 3 Power up remote

Confirm that Red LED #1 Flashes quickly (approximately 12 times)
The flashing LED acknowledges that the unit is powered up correctly and has passed it's internal shelf checks.

Note: LED is disabled when PC connection is made
Note: LED may flash quickly after remote reset from Base is performed.

Step 4 Push Button Diagnostics

When the push button is pressed and released, the diagnostic LED will flash slowly, the number of flashes counted will determine the status level of the RadioNet Remote Unit.

STATUS LEVEL	DIAGNOSTIC DESCRIPTION
1	Unit is okay, battery voltage okay, digital outputs are okay, and remote unit is on the network.
2	Unit is not okay, battery voltage is below the "good" threshold level.
3	Problem with one or more of the digital outputs. Possible cause would be an open or short circuit on one or more digital outputs.
4	Remote unit is not currently on the network.

Note: A status level 2 overrides a level 3 and a level 3 overrides a level 4.

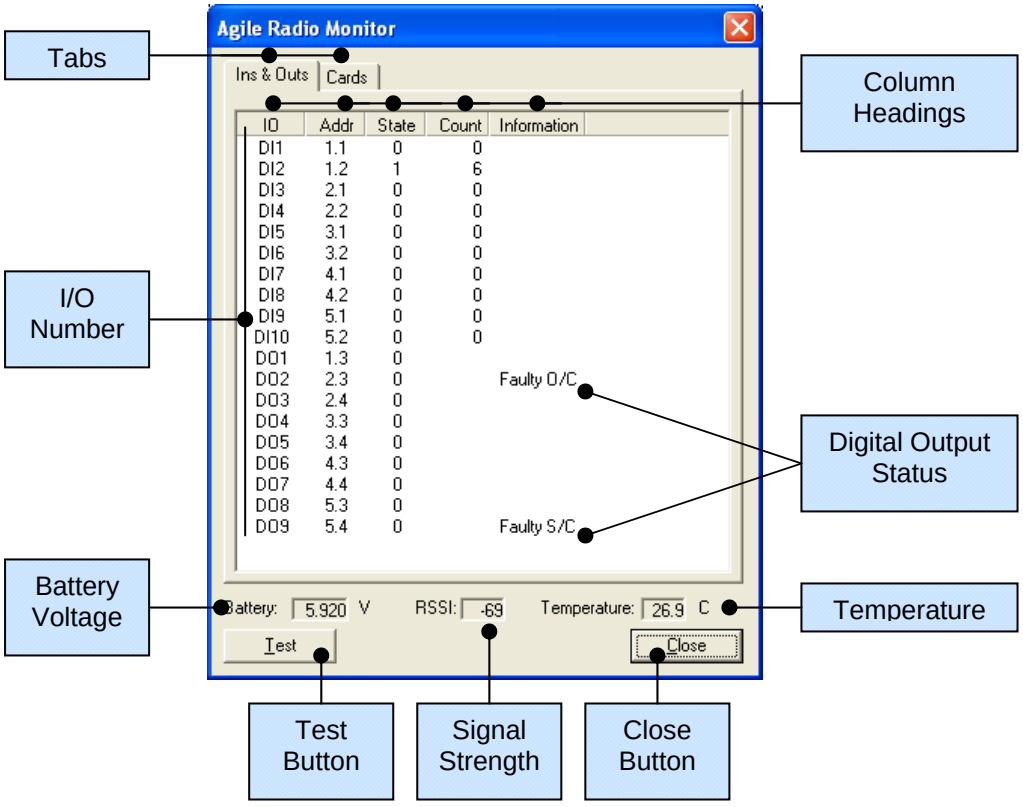
7.6.2. Remote Unit Diagnostics – Software

PoleNet PC Software can be used to connect directly to the communication port of the Remote unit. When selecting the monitor function, a range of functions are monitored, such as digital inputs, digital outputs, battery voltage, signal strength and internal temperature of the Remote units radio.

Step 1 Connect communication cable between PC and Remote unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.4)

Step 2 Access RadioNet – Remote Monitoring Mode
Step 2.1 Select Monitor Button

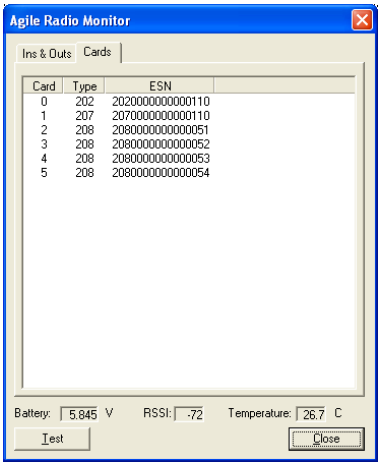
Step 4 Select “Ins & Outs” Tab
The list displays the current number of inputs and outputs that correlates to the number and type of hardware that is connected and functional.



7.6.2.1. Definition of Radio Remote Monitor – Ins & Outs Tab

IO:	Logical Input/Output number available As the I/O expansion cards are plug & play, the I/O number will only appear when the I/O card is inserted and recognized.
Addr:	Physical Address of the I/O available. This Address will be used for mapping of the RadioNet I/O to the Host Controllers I/O.
State:	Current status of the Input/Output. **Inputs:** 0 = OFF (open circuit) 1 = ON (closed circuit) **Outputs:** 0 = OFF (closed/idle) 1 = ON (open/active)
Count:	Total number of inputs (pulses) counted **Note:** Input counted from trailing edge of pulse.
Information:	Status of the command or state **Override:** Output manually activated. **Faulty O/C:** Output detected that there is no solenoid or relay connected. **Faulty S/C:** Output detected that there is a Short Circuit.
Battery:	Current battery voltage level sensed by the Remote Unit
RSSI:	Return Signal Strength Indicator displayed in dBm. This is the signal strength recorded coming from the Master of this remote unit. IE: the received signal strength. **Note:** If the remote has no master, then the RSSI value represents the noise floor.
Temperature:	The current temperature reported of the internal radio board.
Test Button:	Selecting the Test Button puts the units in testing mode. Right mouse click on the DO number will activate a manual command list “On” or “Off”, giving the operator the option to manually activate the digital output. **Note:** Manual operation temporary overrides the Host Controllers operation and may generate a Master Controller Alarm. **Note:** Closing the “Testing” button will automatically close any manually opened digital outputs.

Step 5	Select Cards Tab The list displays the current number of cards that correlates to the number and type of hardware that is connected and functional.



7.6.2.2. Definition of Radio Remote Monitor – Cards Tab

Card:	The card number represents the card position. **Note:** Refer to Annex B for card position number
Type:	The card type number represents that type of card which has been installed in this location. **Note:** Refer to Annex C for Card Type Number
ESN:	The Electronic Serial Number (ESN) of the card which has been installed in this location.
Close Button:	Closes the Monitor screen of PoleNet.

8. Surveyor Mode

Designing a reliable wireless control system requires a very good understanding of local factors such as:

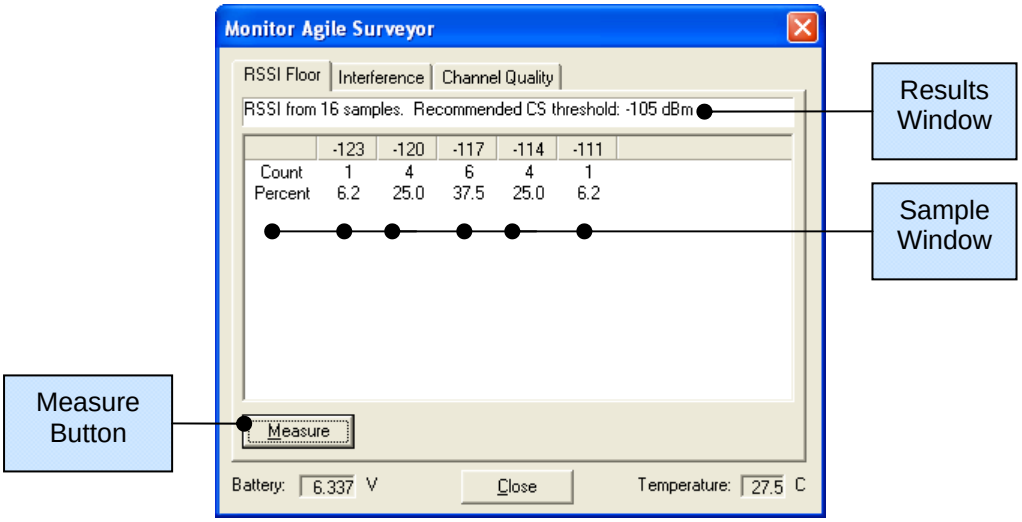
- Location
- Existing atmospheric noise and interfering signals
- Topography
- Distance
- Foliage
- Climate
- Project boundaries

Whilst some of these parameters can be calculated using theoretical data, there is no substitute for practical measurements for real results.

Each RadioNet Remote unit has special built-in firmware to enable it to act in special modes to perform site surveyor tests.

8.4. Surveyor Mode - RSSI Floor

The RSSI Floor test mode is used to determine how noisy the project site is at the nominated operating frequency. The results will provide you with an understanding of the amplitude and duration of the recorded noise levels.



Note: Make sure your test unit has a good antenna at an equivalent height and proximity to the project being investigated, otherwise a poor antenna will give you artificial, better than actual results.

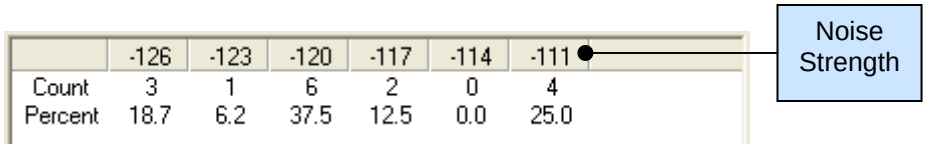
Step 1	Connect communication cable between PC and Remote unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.5)
Step 2	To start the RSSI Floor test, select the “Measure” button
Note:	RSSI Floor test operates for approximately 1 second. To repeat test, pressure the “Measure “ button again.

8.4.1. Definition of Radio Surveyor Mode – RSSI Floor Tab

Results Window:

The “Results Window” displays the average noise level received at the time of performing the test. The Surveyor unit then provides a recommendation of approximately 6dB greater than the average RSSI floor recorded when performing the interference mode test.

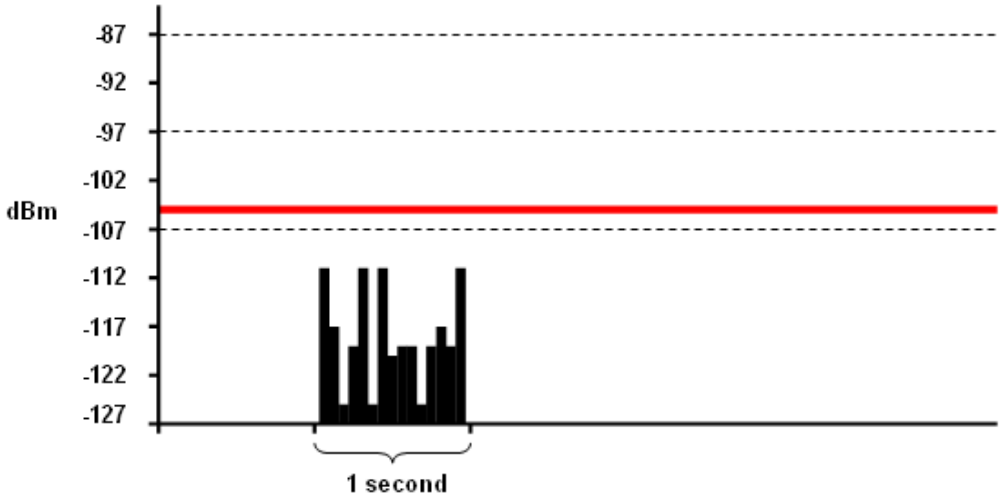
Sample Window:



When the remote unit performs the RSSI Floor test, the unit listens for RF signals and records the strength, number of pulses and the percentage of time that the noise was heard. It then displays the samples taken.

Figure 9.1 below shows graphically what the results would look like if transposed onto a graph. The test only lasts for 1 second, giving you a snapshot of the RSSI noise floor. The atmospheric noise has been recorded as -111 dBm in this example. A good result would see the noise floor no greater than -6dBm below the reported RSSI of your Remote units.

Figure 8.1

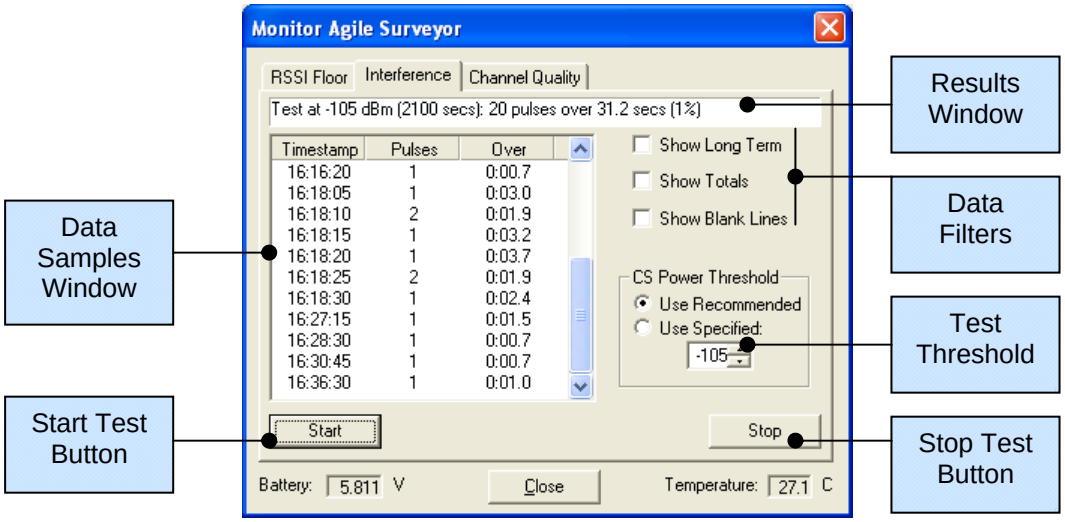


Measure Button:

When selected, the unit will perform a RSSI Floor test by listening and recording the RF environment at the pre-programmed frequency for approximately 1 second.

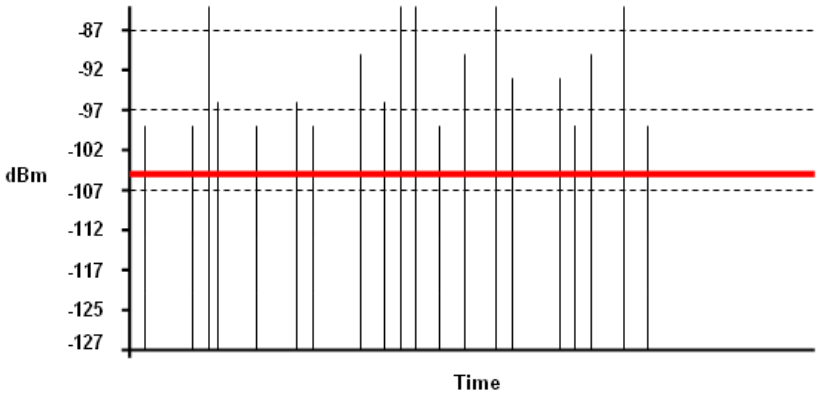
8.5. Surveyor Mode – Interference

The purpose of the interference mode test is to listen and record any interfering RF signal over a larger period of time. The Interference test mode should follow on from the RSSI floor test, where the technician can set the minimum limit to ignore unwanted RF signals. As RF interference is not always consistent, it's best to listen over a larger period of time to obtain an accurate result.



This test doesn't record the amplitude of the interfering RF signals but the number and period of the pulses that exceed the programmed threshold limit. In the example given above, the threshold has been set to -105 dBm. Figure 8.2 below shows graphically, what the results would look like if transposed onto a graph. This example shows that interfering RF signals do exist at this site at the test frequency.

Figure 8.2



Step 1	Connect communication cable between PC and Remote unit, start PoleNet PC software, configure connection and connect. (refer chapter 4.5)
Step 2	Select the "Interference Tab"
Step 3	To start the Interference test, select the "Start" button
Note:	To perform this test over extended periods, simply select the "Close" button and the test mode will stay active.
Step 3	To stop the Interference test, select the "Stop" button

8.5.1.1. Definition of Radio Surveyor Mode – Interference Tab

CS Power Threshold:

The “CS Power Threshold” defines the level in which atmospheric noise and interfering RF signals will be recorded. IE: Only signals which are stronger than -105 dBm will be counted. The user has the option to use the recommended value as calculated during the RSSI Floor test or define a user specified threshold.

Note: If using specified threshold level, the maximum level is limited to -84 dBm.

Start:

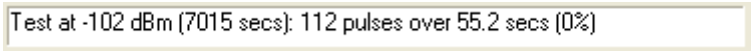
When selected, the Interference test is initiated, constantly sampling the airways in 5 second groups.

Note: If the interference test is to run over extended periods of time, even days, then simply close the screen, disconnect the unit and it will continue with the interference test.

Stop:

When selected, the Interference test will stop

Results Window:

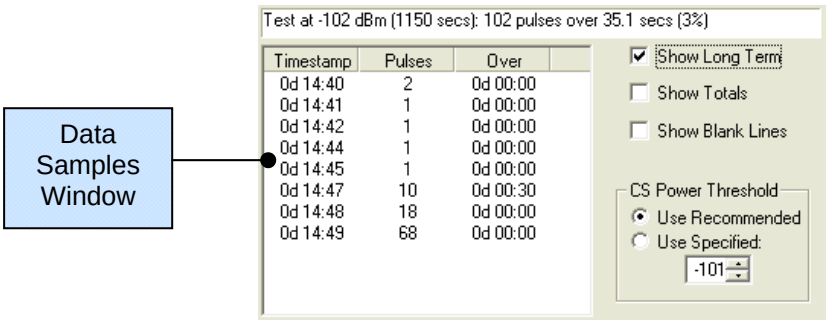


The results window displays the accumulative results since the test was first stated. The unit samples and accumulates results every 5 seconds.

Example:
Signal threshold was set to -102 dBm, the test has been running for a total of 7015 seconds, 112 pulses were recorded above the threshold setting, totaling 55.2 seconds, which overall, relates to 0% interference duty cycle.

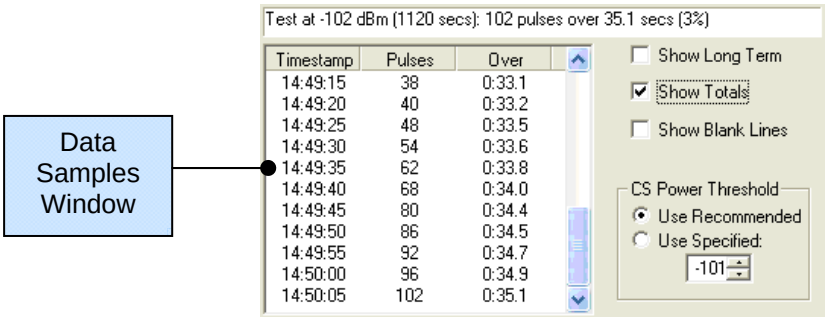
Note: If no interfering signal was recorded, you will not see information in the data samples window.

Show Long Term:


Data Samples Window
Test at -102 dBm (1150 secs): 102 pulses over 35.1 secs (3%)
Timestamp Pulses Over
0d 14:40 2 0d 00:00
0d 14:41 1 0d 00:00
0d 14:42 1 0d 00:00
0d 14:44 1 0d 00:00
0d 14:45 1 0d 00:00
0d 14:47 10 0d 00:30
0d 14:48 18 0d 00:00
0d 14:49 68 0d 00:00
Show Long Term
Show Totals
Show Blank Lines
CS Power Threshold
Use Recommended
Use Specified:
-101

When selected, the data sample window displays the longer term results. IE: Only the periods of time when RF interference was recorded above the threshold setting.

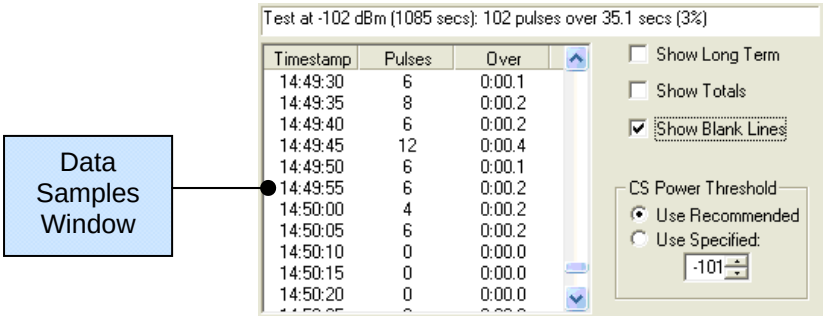
Show Totals:



When selected, the data sample window displays the accumulative total results, both the number of pulses and the total time that the RF interference was recorded above the threshold setting.

Example: At 14:50, a total of 96 pulses with a total combined time of 34.9 seconds was recorded above the threshold (-102dBm).

Show Blank Lines:



When selected, the data sample window displays the results for every 5 second period. Should that period sense interference, both the number of pulses and the duration of the pulses will be recorded.

8.6. Surveyor Mode - Channel Quality

The Channel Quality test mode is used to determine the integrity of the communication path between the base unit and remote sites. We also call this a range test. Only two Remote units are required to perform this test, together with a laptop and PoleNet PC software.

Typically 1 unit (termed the Base) is installed at either the base site or a repeater site, the other unit (termed the Remote) is moved from remote site to remote site to perform the required tests. The test antenna's used should represent as close as possible the type and height of the antenna's that would typical be used for the type of project under test.

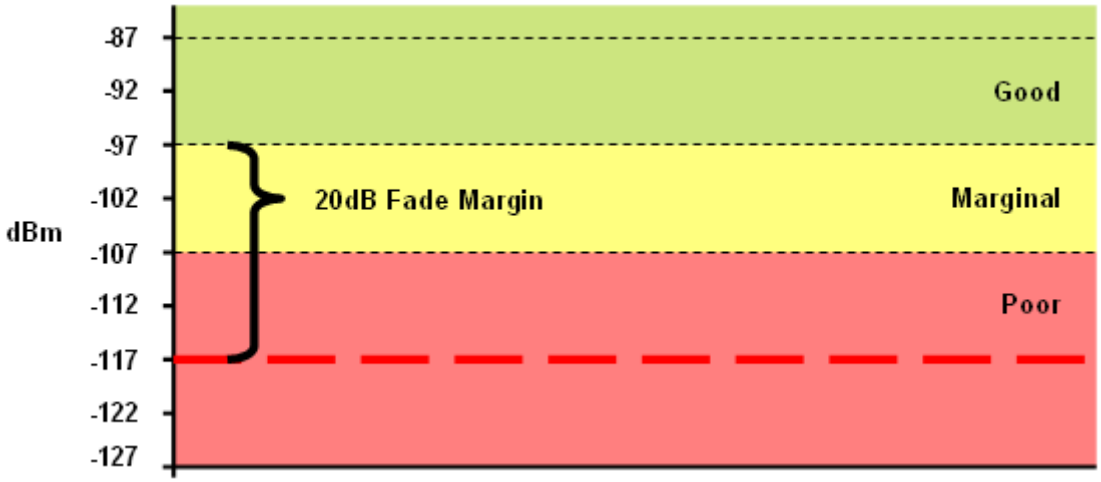
The test performed records both the signal strength and the signal quality. The signal strength is displayed in dBm and the signal quality displays the bit error rate (BER). Both results are as important as each other, as you should have good signal strength and no or very low BER results.

8.6.1. Signal Strength.

Signal strength is measured in dB. Decibels (dB) is a logarithmic scale and is expressed as a ratio. In short, -3db is half (1:2), -10dB is 10 times smaller (1:10) while -20dB is 100 times smaller (1:100).
Please refer to Netafim's manual on "Introduction to RF" for a more detailed explanation.

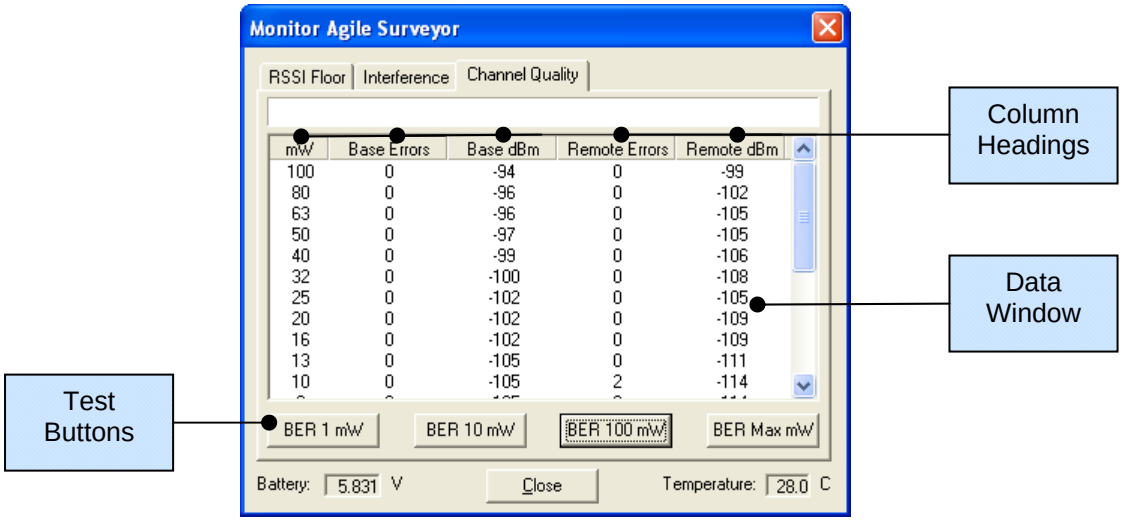
Since the receiver sensitivity of the RadioNet is -117dBm and Netafim recommends using a 20dB fade margin for telemetry applications, a signal strength recorded above -97dBm is considered a good signal for reliable communications. Should the signal be marginal, between -97dBm and -107dBm, then communications signals will still be received, but may induce communication retries which introduce communication delays. Signals below -107dBm are considered poor and unreliable for successful communications.

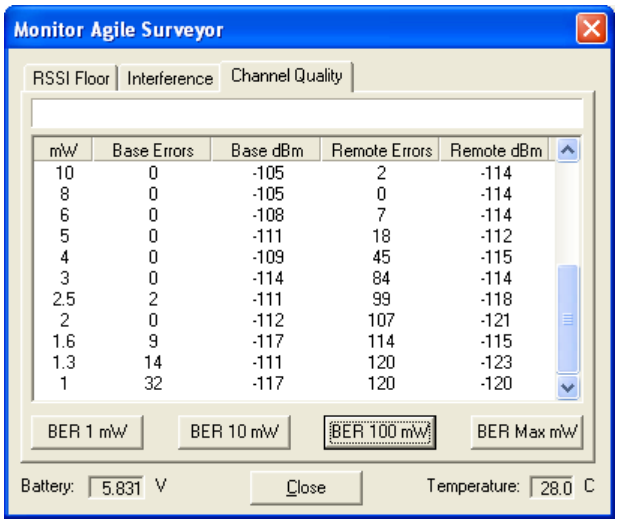
Figure 8.3



8.6.2. Bit Error Rate (BER).

When a channel quality test is performed, a known packet of information (1000 data bits) is sent between the 2 test units. If some of the data is corrupted, then the amount of corrupt data is recorded. This gives you a good understanding of the quality of the signal path between the two test units.





The example given above shows the results of a poor channel quality test. If we compare the results for the 100mW test, the base heard the remote ok at -94 dBm, but the signal strength recorded by the remote was marginal at -99 dBm. It was found that the coaxial cable was damaged at the remote site. If we now compare the results at 10mW, we can see that the BER test started to show errors in the quality of the data being received.

8.6.2.1. Definition of Surveyor Mode – Channel Quality Tab

Power Level Test Buttons:

The channel quality test will be initiated when the required transmission power level button is selected. The remote unit will start by communicating at the highest power level selected, slowly reducing the power levels until the base unit doesn't respond. At each power level, data packets are transferred back and forth so the test is performed in both directions.

Note: Do not perform power tests greater than 10mW without an antenna connected.

mW:

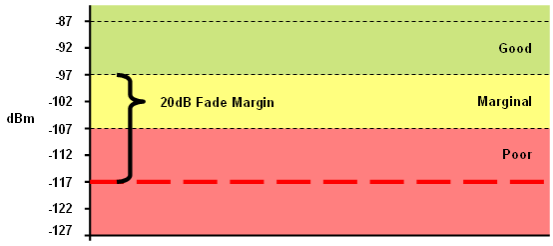
This column represents the power level at which the test was performed.

Base Errors:

This column represents the amount of errors that the base test unit recorded after receiving the data packets from the remote test unit.

Base dBm:

This column represents the signal strength reported by the base test unit after listening to the remote test unit.

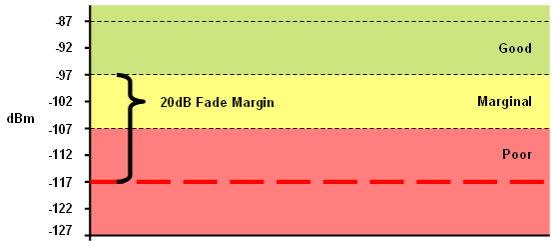


Remote Errors:

This column represents the amount of errors that the remote test unit recorded after receiving the data packets from the base test unit.

Remote dBm:

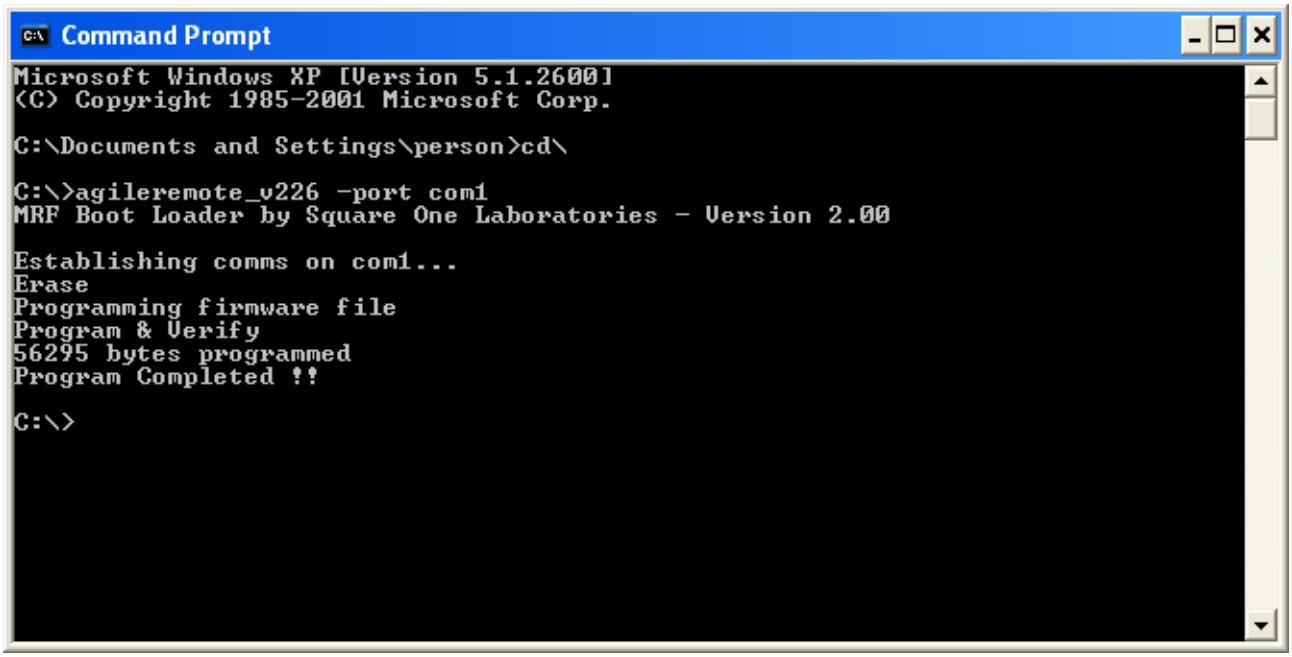
This column represents the signal strength reported by the remote test unit after listening to the base test unit.



9. Firmware

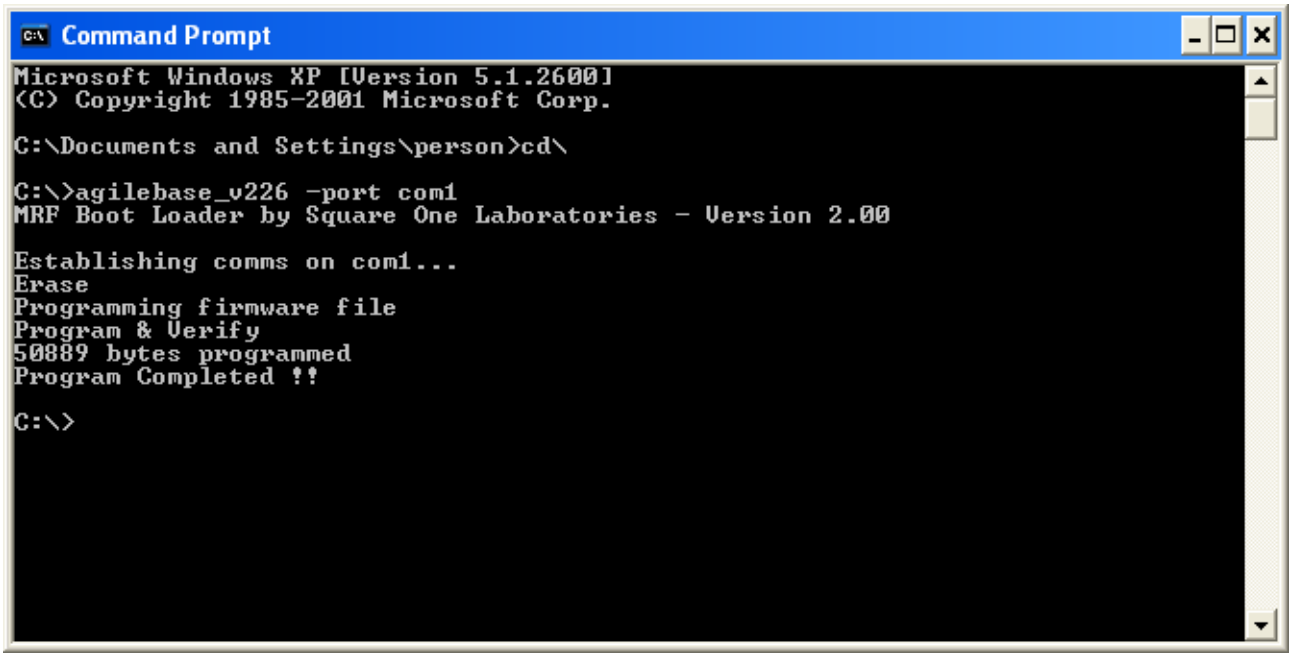
9.4. Firmware Upgrade Procedure for Remote Unit

Step 1 Power down Remote Unit
Step 2 Short program jumper
Step 3 Connect programming lead
Step 4 Power up unit (from 6VDC battery supply)
Step 5 Run command prompt (agileremote_v226 –port com X) (X = active com port Number)
Step 6 View red LED flashes when communication successful
Step 7 Wait for message “Program Completed”
Step 8 Power down
Step 9 Remove programming jumper



9.5. Firmware Upgrade Procedure for Base Unit

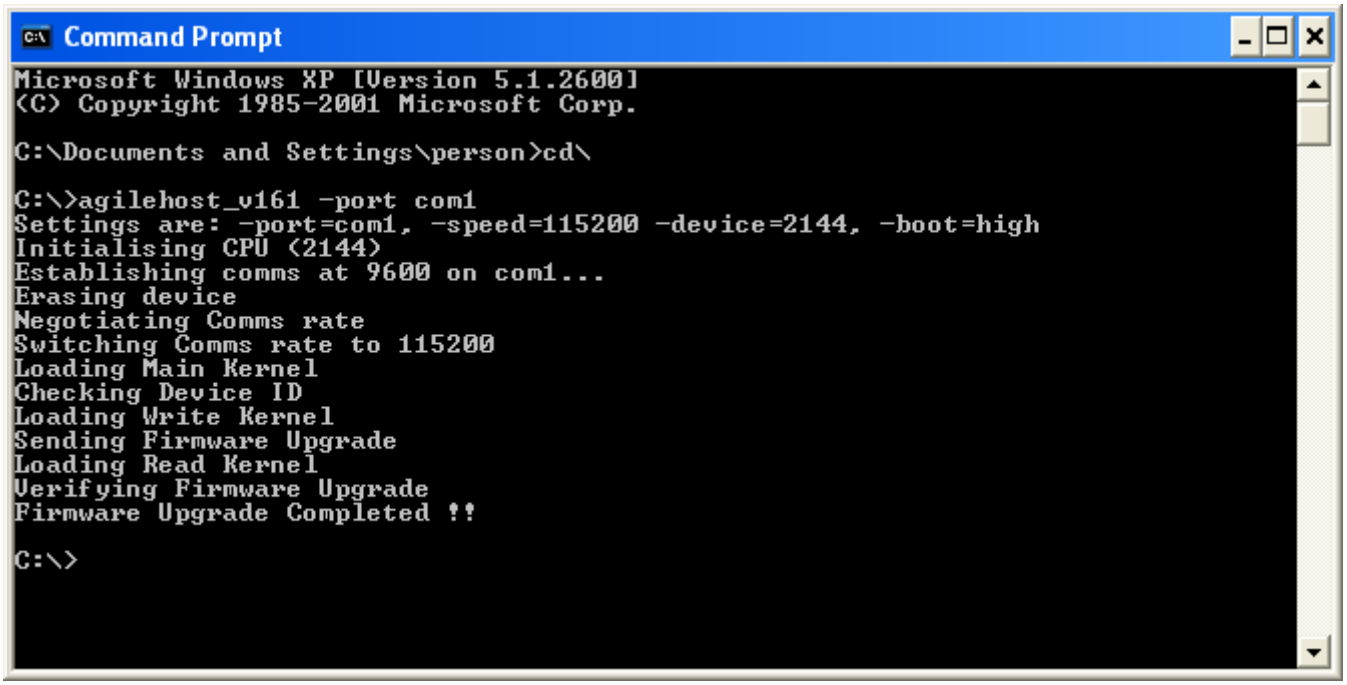
Step 1 Power down Base Unit
Step 2 Short program jumper
Step 3 Connect programming lead to RF45 on board 202 (Radio Board)
Step 4 Power up unit (from RS485 lead from Host or 12 VDC power supply)
Host=RS485in Base=RS485out
Step 5 Run command prompt (agilebase_v226 –port com X) (X = active com port Number)
Step 6 View red LED flashes when communication successful (data receive)
Step 7 Wait for message “Program Completed”
Step 8 Power down
Step 9 Remove programming jumper



9.6. Firmware Upgrade Procedure for Host Unit

Note: Make sure controller communication connections are isolated prior to performing download.

Step 1 Power down Host Unit (remove 12 VDC plug)
Step 2 Short program jumper
Step 3 Connect programming lead
Step 4 Power up unit (from 12 VDC power supply)
Step 5 View green LED # 3, continually flashes.
Step 6 Run command prompt (agilehost_v161 –port com X) (X = active com port Number)
Step 7 Wait for message “Firmware Upgrade Completed”
Step 8 Power down
Step 9 Remove programming jumper



Note: Command prompt is available via the start menu in Windows, select Start, Run, type in CMD and select OK.

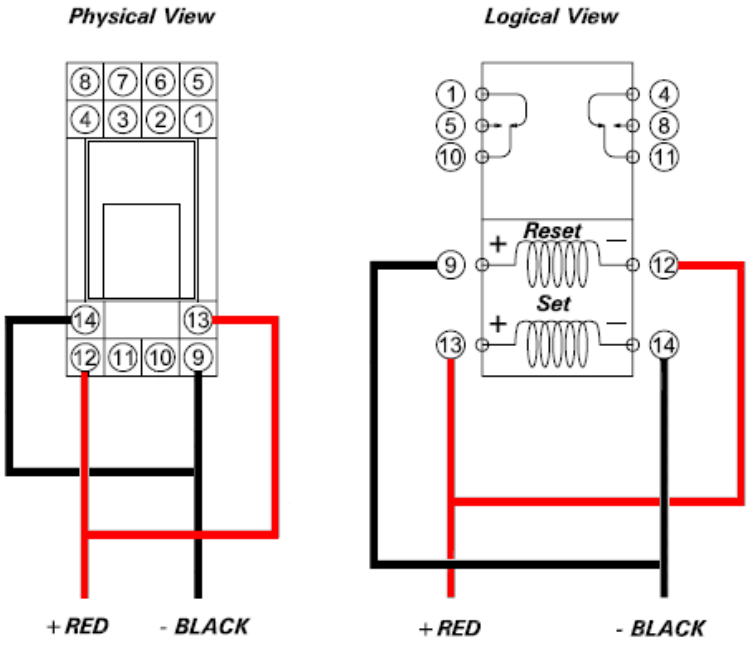
10. Annex A

10.4. Compatible Solenoid & Relay List

Manufacture	Model	Configuration	Wire	Colour
Netafim	Aquative Series 1,	12 VDC Latch Pulse	2	Orange (Open) Black/White (Close)
Netafim	Aquative Series 2,	9-40 VDC Latch Pulse	2	Orange (Open) Black/White (Close)
Baccara	Geva 60	12 VDC Latching Pulse	2	Red (Open) Black (Close)
Bermad	S985	12-50 VDC Latching Pulse	3	Red (Open) White (Common) Black (Close)
Bermad	S982	12-50 VDC Latching Pulse	2	Red (Open) Black (Close)
Bermad	S-392-2	6-40 VDC Latching Pulse	2	Red (Open) Black (Close)
Izumi	RY2KS	12 VDC Latch Pulse	2	Refer Fig. 10.2

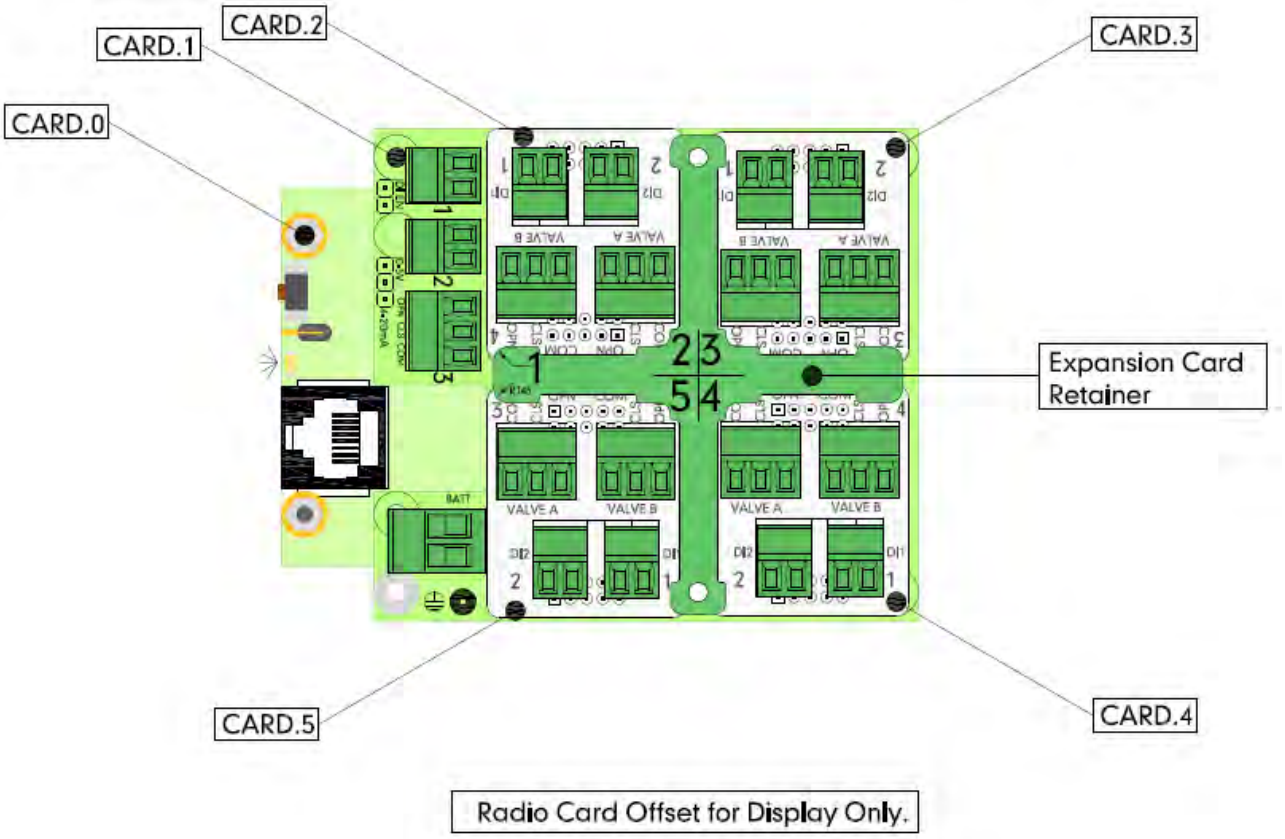
10.5. Izumi Relay Wiring Schematic

Figure 10.2



11. Annex B

Figure 11.1 Card position number.



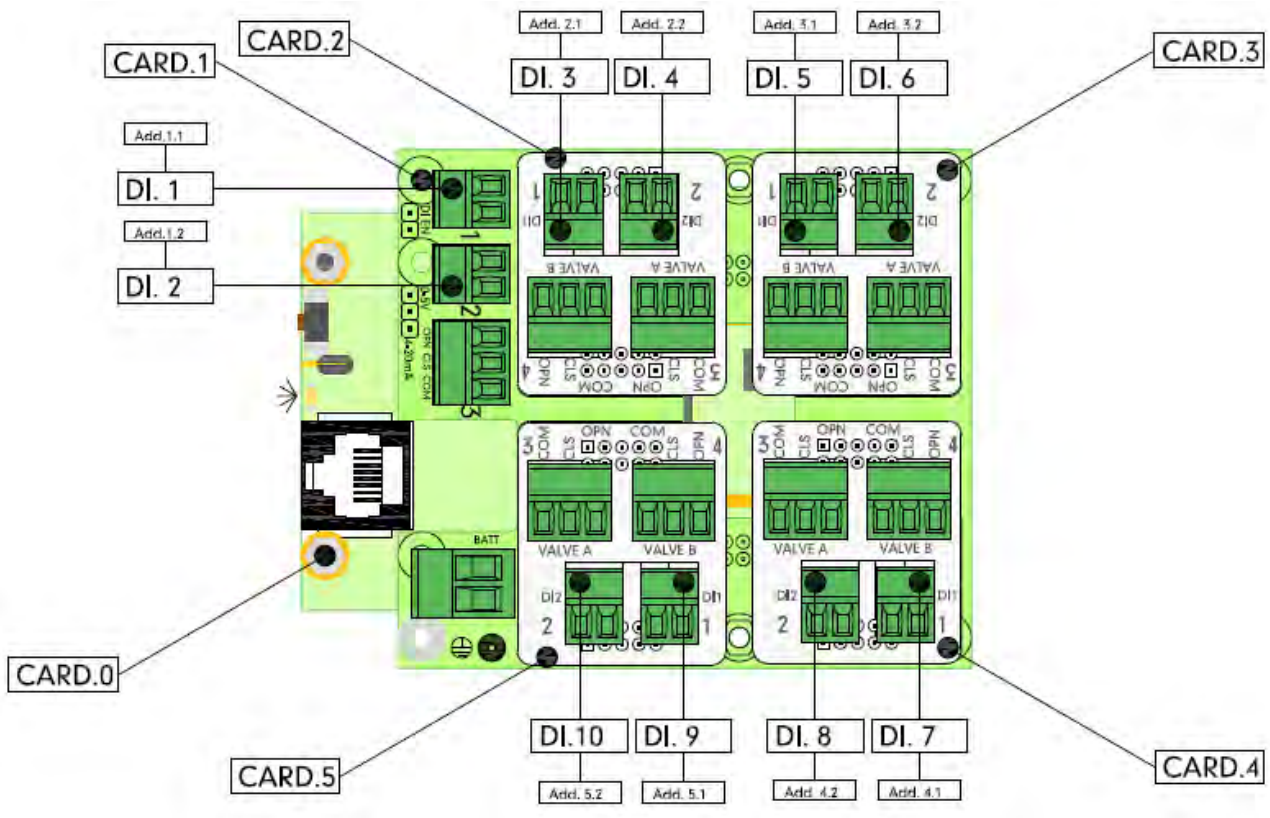
Card Address

2 . 2020000000000109 . 1 . 3

Network # — Remote ESN — Card Location — Position on Card

Annex B

Figure 11.2 DI position number.



Digital Input Address

DI 4 . 2

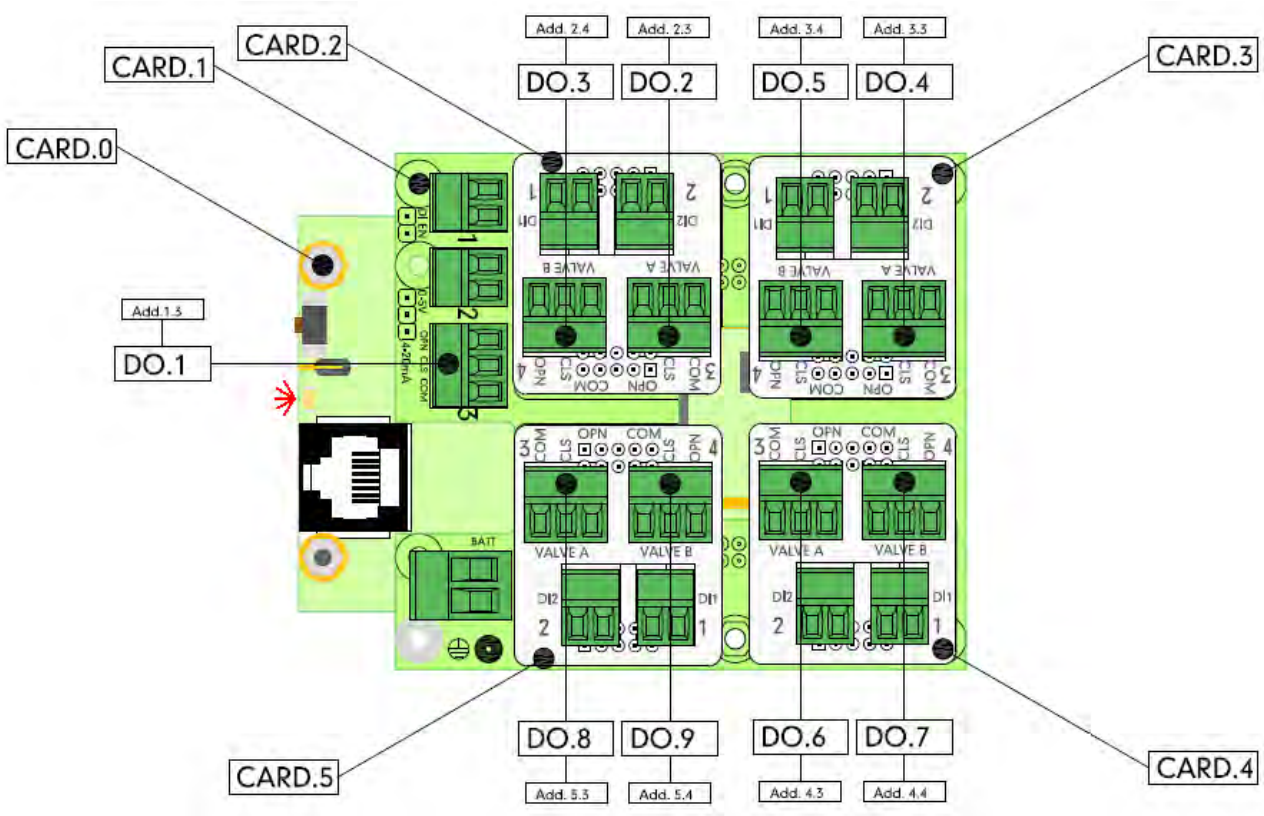
DI = Digital Output

4 = Card Location

2 = Position on Card

Annex B

Figure 11.3 DO position number.



Digital Output Address

DO 4 . 3

DO = Digital Output

4 = Card Location

3 = Position on Card

12. Annex C

Card Number	Card Description
163	48 x Input Expansion Card for Host
202	Radio Board
207	Control Personality Board (Remote)
208	Expansion Card (2DI, 2DO)
209	Control Personality Board (Base)
219	RadioNet Host
239	48 x Output Expansion Card for Host

13. Annex D

Fig: 13.1 Example of “RadioNet Host – NMC-Pro Mapping Form”.

Project Name: _____

RadioNet Frequency: _____

Cycle Time: _____

Backup File Name: _____

Date: _____

	NMC-Pro DO #	Function	#	Remote ID #	Card ID #	DO ID #	Comments
	Example	Valve	1	20200110	2	3	located next to block 6B
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						

	NMC-Pro DI #	Function	#	Remote ID #	Card ID #	DI ID #	Comments
	Example	Water Meter	1	20200110	1	2	Arad, 1000 Litre Pulse
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						

Fig: 13.2 Example of “RadioNet Host – Expansion Card Mapping Form”.

Project Name: _____

RadioNet Frequency: _____

Cycle Time: _____

Backup File Name: _____

Date: _____

	Host	Function	#	Remote ID #	Card ID #	DO ID #	Comments
	Example	Valve	1	20200110	2	3	located next to block 6B
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						

	Host	Function	#	Remote ID #	Card ID #	DI ID #	Comments
	Example	Water Meter	1	20200110	1	2	Arad, 1000 Litre Pulse
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						

14. Glossary

Baud	A data transmission rate (bits/second).
BER	The bit error rate (BER) is the number of bits that have errors relative to the total number of bits received in a transmission.
Comm.	An abbreviation for “communication”
dBm	dBm (sometimes dBmW) is an abbreviation for the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW).
ESN	An abbreviation for “Electronic Serial Number”
ID	An abbreviation for “Identification”
I/O	An abbreviation for “Inputs/Outputs”
LED	An abbreviation for light-emitting diode, which is a small semi-conductor devices that converts electrical energy into bright light.
mW	A unit of power, milliwatt, which is a unit 1000 times less than a watt
kHz	The hertz (symbol: Hz) is a measure of frequency per unit of time, or the number of cycles per second. kHz is 1000 Hz.
MHz	The hertz (symbol: Hz) is a measure of frequency per unit of time, or the number of cycles per second. MHz is 1,000,000 Hz.
NMC	An abbreviation for “Netafim Management Controller”
O/C	An abbreviation for “Open Circuit”
PB	An abbreviation for “Push Button”
PC	An abbreviation for “Personal Computer”
RF	An abbreviation for “Radio Frequency”
RSSI	Received Signal Strength Indication (RSSI) is a measurement of the power present in a received radio signal
SAF	An abbreviation for “Store And Forward”, more commonly known as a repeater
S/C	An abbreviation for “Short Circuit”
USB	Universal Serial Bus (USB) is a serial bus standard to interface devices to a host computer
VDC	Voltage Direct Current. The voltage measurement in a DC system